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JOURNAL OF THE BRITISH MEDICAL ASSOCIATION

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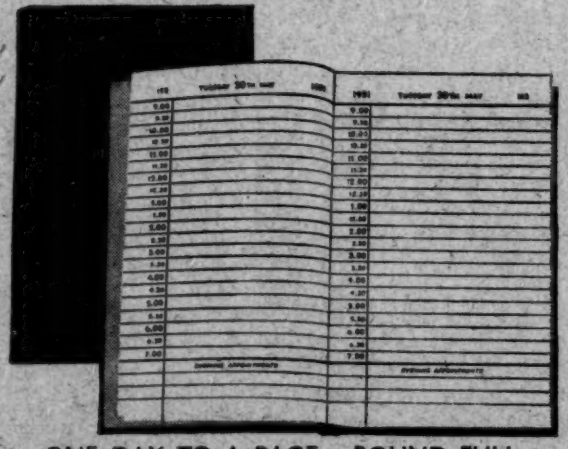

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BRITISH MEDICAL JOURNAL

LONDON SATURDAY NOVEMBER 29 1952

THE PUZZLE FOR THERAPY IN FLUOROACETATE POISONING*

BY

Sir RUDOLPH A. PETERS, *M.C.*, M.D., F.R.C.P., F.R.S.

Whitley Professor of Biochemistry, University of Oxford

I have chosen to commemorate Bertram Louis Abrahams in this lecture by discussing one aspect of a problem upon which my colleagues and I have been working for some years. Though the field is therefore somewhat narrow, and though I cannot give to-day more than a progress report, I hope to show how biochemists can approach a therapeutic problem, and I felt that it would present the opportunity of alluding to a side of biochemistry (chemical physiology) which is of interest to clinical medicine and which has not yet received much attention in previous Abrahams lectures.

In this instance it seems easier to proceed from the particular to the general, and I shall therefore leave my general remarks until the end. It will make the biochemistry more intelligible to those unable to devote much time to reading it if I first make a few general remarks about aspects of modern biochemistry with which I shall have to deal.

Intermediary Metabolism

In the last ten years a great change has come over the subject of intermediary metabolism. It seems that at last, even if it be still on the horizon, a biochemical geography of the tissue cell can be envisaged in which the enzyme reactions concerned in degrading substances like sugars and fats can be tied to definite histological structures in the cytoplasm. I have been specially interested in these new developments because they have been much concerned with the oxidation of pyruvic acid, an intermediate stage in sugar metabolism, which I have studied with colleagues for many years, particularly in brain tissue. By 1939 we had realized that we were dealing with an organized complex of enzymes in this final metabolic stage (Banga *et al.*, 1939); and I felt that some structure was involved, though it appeared to H. M. Carleton and myself then that this was likely to be the nucleus (cf. Brachet (1950) for modern views on the nucleus).

The new developments indicate that it is a reasonable hypothesis to suggest that the enzymes concerned are in or closely associated with the mitochondria (Hogeboom *et al.*, 1948; Lehninger, 1951; Judah, 1951); in fragmented cells they centrifuge with the heavier parts of the cytoplasm and therefore are more strictly defined by calling them the "larger granules." For the purpose of this lecture I will call them mitochondria: part at least of the varying biochemical behaviour of tissue preparations can be explained by considering how far the mitochondria have remained intact in course of preparation of the tissue. For instance, normally in liver they are sausage-shaped (2–5 μ long, 0.5 μ wide) and stain with Janus green, and this is still their appearance if the tissue preparations are kept in strong sucrose solutions. A change of medium to phosphate-KCl leads to an alteration to a more globular shape, with loss of staining capacity; the structure behaves as if enclosed in a semipermeable membrane. It has been calculated (by Claude, 1949) that a mitochondrion in mammalian liver could accommodate at least one million protein molecules. There is therefore ample room for several sets of enzymes concerned with quite complicated metabolic changes.

It is a modern view that both carbohydrates and fats are reduced in the course of metabolism to fragments containing two carbon atoms. In the higher animal, for some reason that no one understands, this two-carbon acetyl-like fragment is not oxidized directly. Instead, it is condensed with a four-carbon acid (oxaloacetic acid) by an enzyme (known as the condensing enzyme) to form an acid with six carbon atoms—namely, citric acid (see Fig. 1). The existence of this condensing enzyme is certain, as it has now been isolated and crystallized by Stern *et al.* (1950). Once obtained, the citric acid is successively transformed via *iso*citric acid to a five-carbon and then a four-carbon acid again, with the elimination of the original two-carbon fragment as CO_2 and H_2O; the four-carbon acid so formed is ready then for the condensation of another two-carbon fragment. This cyclical process has been known as the tricarboxylic acid cycle. It had roots in earlier work, but the final form is due to Krebs (1950), of Sheffield, who saw that work by Martius and Knoop could be fitted to that of Toennisen and Brinkman and of Szent-Györgyi to form a whole.

There are strong reasons for thinking that the battery of enzymes needed for this purpose exists within the mitochondria; again, it has been calculated that there might be some 2,000 enzyme-organized units in the mitochondria: such figures are quoted only to orientate one's thought. This intrusion of citric acid as a stage in normal metabolism is most interesting; for 40 years, since the work of Thunberg, and of Batelli and Stern, it has been known that enzymes existed in the animal capable of dealing with it, and about 10 years ago it was found to be a constituent of bone and skin (Dickens). In this lecture I am not really concerned with history; considering the enzymic development as a whole, it is satisfactory to realize that the work of F. G. Hopkins (especially with W. M. Fletcher) had much to do with the earlier development, as also Garrod's conception of the enzymic cause of inborn errors; and other British work has continued their stimuli. Much credit must

*Bertram Louis Abrahams Lecture delivered at the Royal College of Physicians of London on July 3. This lecture was illustrated by lantern slides, only some of which are reproduced here.

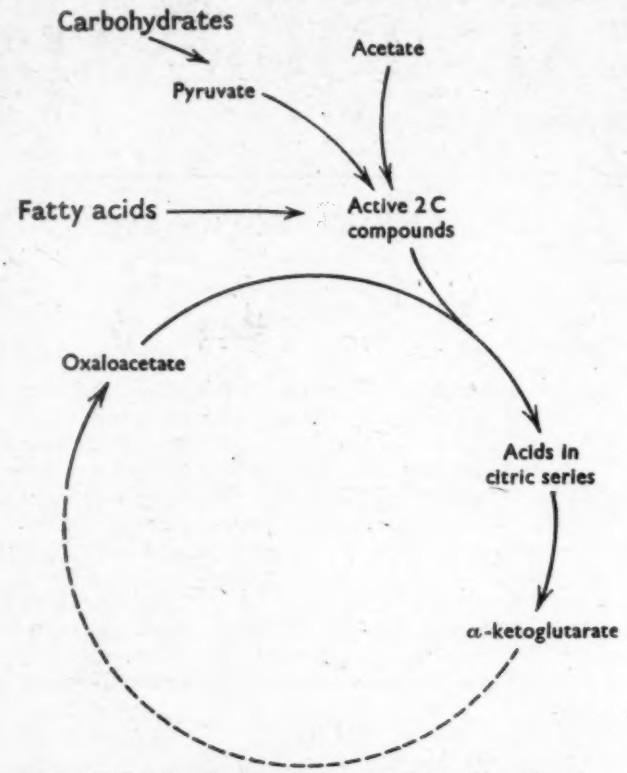

FIG. 1.—Showing the course of the tricarboxylic acid cycle.

also go to workers in Germany, Belgium, and the United States for other and for more modern developments. The idea that mitochondria were the seat of enzymic activity is an old one (Bourne, 1951). I hope to show that some of our own work has carried these concepts of the mitochondrial tri-cycle a little further by proving their existence *in vivo*. With this background, we can now embark upon the main story of this lecture.

Effect of Fluoroacetic Acid

Fluoroacetic acid ($F.CH_2COOH$) is chemically a simple substance (Swarts, 1896). It has been proposed as a rat poison (and has been known in the U.S.A. as compound 1080). About 20 minutes after giving a dose of 5 mg./kg. to a rat the animal begins to show signs of disturbance and may spread its feet out (Fig. 2). Without warning it may then suddenly convulse, and often becomes so rigid that it can be picked up by the tail. It may die in such a convulsion or in a subsequent convulsion. If this does not happen the animal becomes weak and usually collapses within the next 24 hours; this latter is probably due to heart failure.

Other animals show these signs differently; in the dog the effect is predominantly nervous, whereas in the rabbit it is upon the heart: for collected data see Chenoweth (1949). The dog is killed by 1/100 of the dose which kills the rat; this is a reason why it is not a good rat poison—for example, in a series of very carefully staged trials against rats the poison was picked up by and killed one calf, three dogs, four cats, six chickens, and 25 wild birds (Barnett and Spencer, 1949). Frogs and toads are extraordinarily resistant. Generalizing, there are two main classes of attack made by the poison in animals—an attack either upon the central nervous system or upon the heart.

Until comparatively recently, fluoroacetic acid was to some extent a chemical curiosity; but in 1944 Marais identified it with a well-known South African plant poison. According to Dr. du Toit, the director of the Onderstepoort Laboratory, this plant, *Dichapetalum cymosum* (Fig. 3), is so troublesome that large areas of the Transvaal in which it is localized have to be fenced off to prevent cattle eating the shoots, which are especially poisonous in spring and autumn.

According to Steyn (1928) signs may appear in sheep and goats as early as six hours after ingestion. The animal stops feeding and becomes uneasy. There are then nervous signs, hyperaesthesia, quivering of the muscles, exaggerated reflexes and swaying gait, and diarrhoea; it tends to lean up against walls, and finally becomes comatose and dies.

The finding of this curious substance in nature again underlines the old and well-worn saying that "there is nothing new." From the standpoint of agriculture alone it would be valuable to be able to cure these animals; but there is more than a hint, as I will mention later, that a similar poison may have been used on man. Hence it is also a human problem.

FIG. 2.—Rat in tonic convulsion due to fluoroacetate poisoning.

During the years 1941–3 fluoroacetic acid and related substances were investigated by physiologists, biochemists, and pharmacologists, as well as by organic chemists, because a knowledge of the behaviour was necessary for defence purposes. At this time it was learnt that man was, like the monkey, relatively insensitive to the poison: a particularly striking proof of this was given by Professor Adrian, who took with no harm a dose capable of killing a guinea-pig or a rabbit. The only therapy which could then be suggested was the early injection of a rapidly acting anaesthetic, followed by intramuscular injection of a cortical depressant (phenobarbitone, etc.) (Foss, 1948).

Some Curious Facts

About that time several other facts were learnt, some very curious. The C–F bond is very stable and is not taken to pieces in the body, unlike the C–I bond in iodoacetate. In a series of carbon compounds with increasing length of carbon chain there was a striking alternation of toxicity with this increase. It was somewhat like the Knoop rule for the fatty acids giving acetoacetic acid: compounds containing two, four, and six carbon atoms were toxic; those with odd numbers not so (Saunders, 1947). Furthermore,

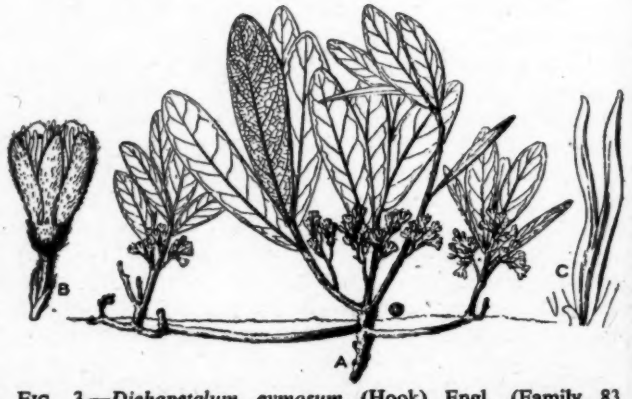

FIG. 3.—*Dichapetalum cymosum* (Hook) Engl. (Family 83. Chailletiaceae). A, plant, showing habit and underground stems; B, flower; C, bifid petal with scale at base. From Burtt Davy in *Journ. Ecol.*, Vol. 10.

fluoroacetate was quite harmless to isolated enzymes: this was especially worrying to biochemists like ourselves, who felt that in such a striking pathological condition the biochemical lesion must be enzymatic in origin, as appeared to be well proved for many arsenicals. One metabolic fact only was found by Bartlett and Barron (1947): under some conditions, in tissue slices, fluoroacetate could induce an accumulation of acetate, suggesting that it was blocking metabolism at the acetate stage.

This biochemical fact led to trial of acetate injections without therapeutic success; but similar ideas, with the addition of a suggestion derived from the fact that alcohol catalysed acetate metabolism in yeast, led Hutchens *et al.* (1949) to try the therapeutic effect of alcohol and acetate in combination and alcohol alone. This treatment is successful in some animals (mice and guinea-pigs) and not in others (dogs and monkeys). It was clear, however, that the only hope for rational progress in therapy lay in more information about the initial biochemical lesion.

Interesting Laboratory Findings

During the last five years we have been able, in my laboratory, to bring to light some new biochemical facts of interest. They may be summarized in the short statement that, though fluoroacetate is not toxic itself to any enzyme, it is converted *in vivo* by the synthetic action of tissue enzymes into a fluoro-compound which has a marked enzymic toxicity *in vivo* as well as *in vitro*. This is why, in my Croonian lecture last year, I called it a lethal synthesis (Peters, 1952). No longer, therefore, does this poisoning form an exception to the rule that a toxic condition of this nature is induced by an attack upon enzymes. This statement may now be expanded, and presented in two parts: the facts first, and then some biochemical explanations. It was found that, *in vitro*, kidney preparations poisoned with fluoroacetate accumulated relatively larger amounts of citric acid (Liébecq and Peters, 1949), and that, when animals such as the rat were given injections of the poison, even within an hour many tissues showed the accumulation of citric acid in large amounts (Buffa and Peters, 1949).

Based upon the ideas with which I introduced this lecture, a hypothesis could be constructed to account for these citric acid accumulations.* The fluoroacetate (or other FC–C fragments from longer-chain fatty acids) condensed like acetate to form a fluorotricarboxylic acid, which then blocked the further metabolism of the citric acid intermediate, so leading to the citrate accumulations (Fig. 4). A fluorotricarboxylic acid might be expected to be incompatible with an enzyme dealing with citric acid owing to its asymmetric C centres, whereas there seemed no reason why the condensing enzyme should distinguish between acetate and fluoroacetate.

At this stage it might be thought that therapy would consist in restoring the missing acid of the tri-cycle; we tried this, as did others, and an apparent temporary success was attained with the 5C acid α-ketoglutaric acid which on further investigations turned out to be wrong. These failures convinced me that we had to delve further into the biochemistry before we could decide even whether any logically designed therapy was possible.

The first task was to prove that a synthesis had really taken place. This took us much longer than we thought it would, and I will not weary you with the details of the isolation. Suffice it to say that it involved shaking ground kidneys of rabbits, guinea-pigs, or dogs in a suitable buffered medium with a substrate (fumarate) and fluoroacetate, and then separating this from the mixture in a yield of not more than 1–2 mg. of the fluoro-compound which is inhibitory to citric acid metabolism from kidneys of two rabbits. In this way, and using some modern techniques, we got some 7 mg. crystals of a fluorotricarboxylic acid about 11 months ago:

*This hypothesis was first advanced independently about the same time (June, 1948) by Liébecq and Peters (1949) and by Martius.

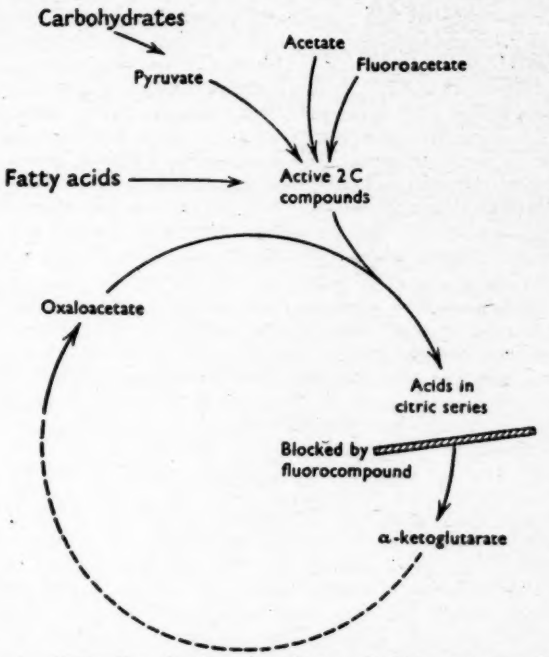

FIG. 4.—Illustrating the jamming theory of fluoroacetate action.

thereby we proved the synthesis, but we did not prove the nature of the acid (Peters *et al.*, 1952).

That it is actually one of the possible fluorocitric acids is made more likely by some recent work. D. G. A. Rivett, of South Africa, now working in the Ministry of Supply Experimental Station at Porton, has recently provided me with a specimen of sodium fluorocitrate prepared from the ester of synthetic fluorocitric acid with which our own preparation could be compared. Preliminary tests by R. Wakelin and myself upon the synthetic fluorocitrate indicate that it has about half the inhibitory activity of our isolated fluorotricarboxylic acid. This would be expected if the synthetic salt is a mixture of four diastereoisomers, two of which are active. This further evidence is strong support for the idea that our compound is actually fluorocitric acid.

The Inhibited Enzyme

The next question which arises is, What is the enzyme which the fluorocitrate inhibits? To answer this we had again to probe more deeply into the detailed behaviour of these metabolic enzymes. There are only two possible ones—aconitase and *iso*citric dehydrogenase (Fig. 5); of these, aconitase is the one attacked; no effect has ever been found on the *iso*citric dehydrogenase. Preliminary work in my laboratory (with Lotspeich and Wilson) showed that the fluoro-inhibitor could inhibit the enzyme aconitase competitively (Peters, 1952).

During the last year Dr. J. F. Morrison has spent a long time in the purification of aconitase and has got further in this than others before him. As the behaviour of the "inhibitor" to the enzyme is fundamental to the therapeutic problem, some points in his work can be mentioned.

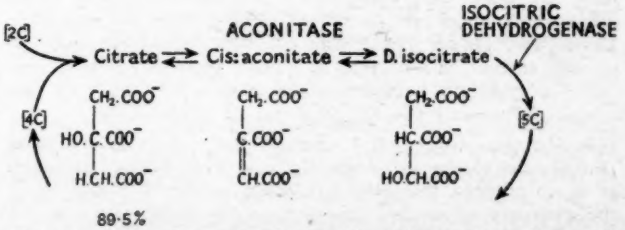

FIG. 5.—Enlargement of tricarboxylic acid reactions of the tricarboxylic acid cycle.

The enzyme has the peculiarity discovered in America (by Dickman and Cloutier) that it requires ferrous iron and cysteine for its activity. The new point has arisen (unpublished) that the purified enzyme is less inhibited by a given amount of fluoro-inhibitor than the cruder aconitase with which the work was done last year. The meaning of this is not yet clear; the fundamental attack upon the aconitase must involve other factors still to be understood. Therefore, though the biochemical lesion has now been found to be in the aconitase, there are details not yet definite regarding the basic mode of attack.

We now come to a curious feature of the story. We realized some two years ago that much more of the fluorocitrate (at least 10 times the amount) was needed to interfere with the isolated soluble aconitase enzyme than with the enzyme as we found it in the kidney preparations, which had been used as a guide in the isolations. This difference is clearly fundamental to our understanding of the phenomena. Going back to the remarks in my introduction, there is one great difference between the soluble aconitase enzyme preparation and that in our test kidney systems: in the latter the enzyme is still organized in the mitochondrial tri-cycle. The magnified effect of the fluoro-inhibitor might be due to the fact that it is exerted in the box enclosed by the mitochondrial envelope. In the ground kidney which we use in phosphate-KCl solution there is evidence that the mitochondria are partly damaged; in undamaged mitochondria citrate penetrates the permeability barriers with greater difficulty. I believe that it is this trapped fluorocitric acid synthesized *in situ* which is somehow responsible for the tissue-poisoning and pathological abnormalities.

Remarks About the Toxicity of the Citric Acid Itself

Turning now to the toxic signs, I have suggested elsewhere (Peters, 1952) that there are two possible reasons for the toxicity *in vivo*: (1) the interference with the supply of energy through the retardation of normal intermediary metabolism at the aconitase stage, and (2) an actual toxicity of the accumulating tricarboxylic acid, owing to its combination with calcium (or other divalent metals). Upon analogy with the motor-car, this would mean in the one case cutting off the petrol supply, and in the other perhaps a dirty sparking-plug.

In regard to (1) there is an analogous case: deficiency of vitamin B_1 blocks the pyruvate stage and can so induce convulsions in pigeons. There can be, however, considerable argument whether (2) is a contributory factor. I do not think it could be expected on physiological grounds that there would be a direct relation between the concentration of citric acid and toxic signs; such a view makes no allowance for physiological adjustment. We have to remember that the action would be on Ca^{++} *inside* cells, about which little is yet known. In favour of (2) we have the facts that toxicity is practically always preceded by an increase of citrate in the tissue, that citrate is well known to combine with divalent ions like Ca, that Sprague-Dawley rats have never survived a dose of fluoroacetate sufficient to cause the citrate concentration of spleen, heart, and kidney to exceed 1.7 mg./g. fresh tissue (Lindenbaum *et al.*, 1951), and that fluoroacetate-poisoned animals are more susceptible to injections of KCl, suggesting an alteration in ionic balance (Chenoweth *et al.*, 1951). Against (2) it may be said that intravenous calcium gluconate and magnesium injections do not cure the convulsions (Eeg-Larsen and Naess, 1951); the question is whether this Ca or Mg enters the tissue cells. Then there is certainly no direct correlation between concentration of citrate in the brain of rats and the actual onset of convulsions.

In the dog, according to Kandel and Chenoweth (1952), convulsions can occur when there is little general increase in brain citrate; the latter argument would be improved if the existence of specific increases in the lower parts of the brain could be excluded. An extreme case is presented by *Xenopus laevis*, which is abnormal in tolerating large doses of poison; this animal's heart can function normally for days with a high concentration of citrate. In this animal, as a secondary effect, Banister and Foulkes (unpublished—see Peters, 1952) have found a gradual entry of Ca ion into the poisoned heart.

Clearly, more work is wanted to settle these matters; but I shall be much surprised if the accumulations of citrate do not prove to enhance the toxic effects. Quite recently we have been able to get typical convulsions in pigeons in 12 minutes and 20 minutes respectively by injections of some 100 μg. of fluorocitrate into the subarachnoid space; in both these cases a definite rise in citrate had occurred. Since saline injections are harmless, this experiment is a particularly striking demonstration of an *in vivo/in vitro* biochemical correlation, and goes far to prove that the actual toxic agent is fluorocitrate.

Returning to the therapeutic problem, we can see that, fundamentally, what is required is to reverse the inhibition of aconitase produced by the fluorocitric acid. Theoretically, the tissues may be said to do the best they can, because the mere accumulation of tricarboxylic acids should in itself stop the inhibitory action. It would be a good thing to increase this, but we do not know yet how much tricarboxylic acid can be present at any moment in mitochondria without disrupting them. Attempts to cure poisoned rats by giving them cis-aconitate have failed, and this we can understand because even fluorocitric acid does not get into undamaged mitochondria at all easily. It is relevant to recall that experiments by Lindenbaum *et al.* (1951) have shown that with sublethal doses in rats the citric accumulations gradually disperse in 24–36 hours. Hence, the F citric must slowly get away. Our best chance is therefore at present to keep the poisoned animal alive somehow until the F citric can get away.

The fundamental therapeutic problem we have here is the inverse of that with the virus. With the virus we want to penetrate the cell wall and the virus envelope in order to attack its structure without causing permanent damage to the cell organization. To reverse fluoroacetate poisoning we want to increase the concentration of a normal cell constituent without upsetting tissue relationships. How to undo this locked biochemistry is still the unsolved puzzle.

Mitigation of the Effects of the Poison by Protection

Since we cannot yet reverse the biochemical lesion we are driven back to any possible preventive measures. The first thing which occurs to mind is whether the condensation to fluorocitric acid can be stopped. In this connexion Kilby and Carpenter, of Adrian's team (unpublished results), found in 1943 that pyruvate postponed the toxic action of fluoroacetate upon the isolated rabbit heart; more extensive independent experiments in the U.S.A. gave similar answers (Chenoweth, 1949). Though it was unknown then that fluorocitrate was formed, a reference to Fig. 4 will show that pyruvate via its C–C fragment might well compete with fluoroacetate for entry into the tri-cycle. More recently Chenoweth *et al.* (1951) have had a striking therapeutic success with glycerol monoacetate, which they introduced upon the general idea that substances yielding acetate during metabolism seemed to antagonize fluoroacetate in isolated tissue preparations. Good results were obtained in rabbits, in dogs, and even in monkeys; abnormalities of cardiac rhythm, etc., were reversed. It seems that the good results of this compound are due to its capacity for penetrating cells and producing "nascent" acetate.

As the theory of using a C–C compound for protection depends upon the idea that it prevents the toxic substance from exerting its action, it follows that, according to our jamming theory, it should stop the formation of the fluoro-inhibitor. As we were in a position to test this directly, I have recently done a series of experiments with Mr. R. Wakelin, the gist of which is here given. Turning the tables, the fluoro-inhibitor can be used as a specific agent for jamming tissue changes at the citrate stage. In this way the synthesis of citrate from various substances can

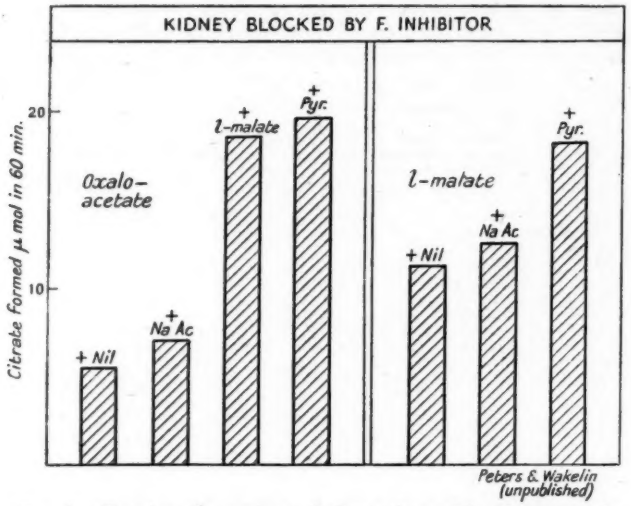

FIG. 6.—Showing the amount of citrate formed in 60 minutes by identical amounts of kidney homogenate in the presence of oxaloacetate and L-malate as substrates and with additions of sodium acetate, L-malate, and pyruvate.

be studied in the organized enzymes of the mitochondrial kidney preparations. Fig. 6 thus shows the formation of citrate from oxaloacetate, L-malate, and various other additions. The best combinations were oxaloacetate + pyruvate and malate + pyruvate. On the whole these experiments, with some exceptions, are consistent with recent work upon the role of coenzyme A and the tricarboxylic acid cycle.

Naturally I thought that synthesis of the fluoro-inhibitor would occur similarly; but, surprisingly, experiment has given a different result. By the biochemical device of blocking the kidney preparations with malonate, synthesized fluoro-inhibitor can be estimated in presence of free fluoroacetate. In this way we have found that the 4C acid which produces most fluoro-inhibitor is not oxaloacetate but L-malate. In fact, the presence of oxaloacetate decreases the yield. Fig. 7 summarizes the experimental facts. The observations are curious and may mean ultimately that we shall have to take into account alternate modes of entry (such as that shown in Fig. 8) into the tri-cycle. Especially is this likely because we have not been able to show any formation of fluoro-inhibitor from oxaloacetate + fluoroacetate by the pigeon liver preparation (Stern and Ochoa, 1949), which produces citrate well from oxaloacetate and acetate.

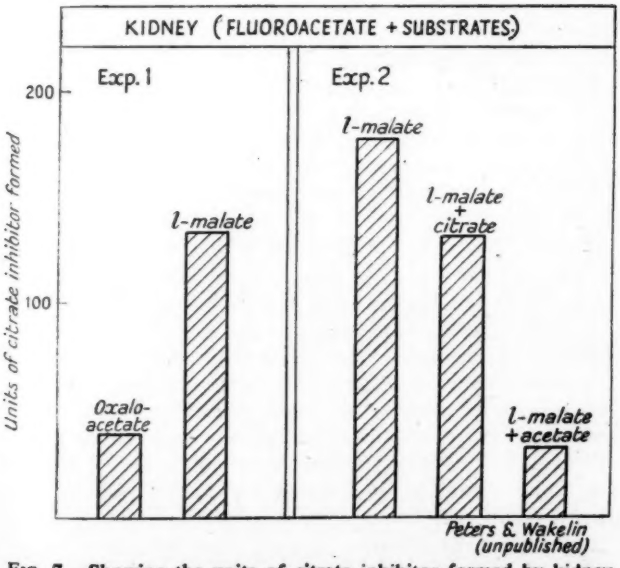

FIG. 7.—Showing the units of citrate inhibitor formed by kidney homogenates in the presence of fluoroacetate and various substrates in two experiments.

Whether our new facts can be fitted into the "old bottles," or whether they will necessitate some modifications of existing theory on the tri-cycle, must be left to the future. Meanwhile, the system makes it possible for us to study what substances prevent the entry of fluoroacetate into the cycle: both acetate and pyruvate in small amounts stop this synthesis, and, as would be expected, citrate can also inhibit slightly. It is therefore now an idea firmly based on biochemical experiments that –C–C substances, if administered early enough and with a sufficiently maintained concentration, should stop the formation of the fluorotricarboxylic acid and, as this is responsible for the effects, the toxic signs. One prerequisite *in vivo* must be penetration to the active centre (in the mitochondria), and this is evidently why the monoacetin discovery of Chenoweth and colleagues is of so much practical value.

Before coming to my concluding remarks, there is one related piece of work which is of interest.

Dichapetalum Toxicarium

Up to this point I have omitted any allusion to the poison from any other plant than the African Gifblaar. In the Sierra Leone district there is another plant of the same genus, known as ratsbane, which has been used by those euphemistically called the local doctors and which was generally believed to be responsible for "broke back," the cause of many deaths. I have alluded to this at more length in my Croonian lecture. The signs of poisoning seemed to be so like those of fluoroacetic acid that investigation was needed. Through the kindness of Sir John Simonsen, F.R.S., I have received some of the seeds, and can state upon the basis of some preliminary experiments that these contain a poison which kills rats, with production of large citrate accumulations in the tissues. Hence it may well be that this is also a fluoro-compound, and that "acetyl-like" compounds could also be used in these cases for protective therapy.

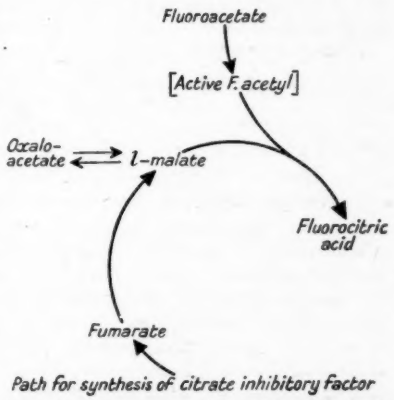

FIG. 8.—Summary of experimental facts regarding the synthesis of the fluoro-inhibitor from fluoroacetate.

Applications in Biochemistry

Dissection by the use of poisons has been employed in the past by physiologists; Langley, for instance, used nicotine to map out the autonomic nervous system. Toxic agents are now being employed by biochemists with equal success to map out the course of metabolic events *in vivo*. In fluorocitric acid we have a new inhibitor which is apparently selective for the aconitase stage of the tri-cycle. In this lecture I have been able to report for the first time the use of this inhibitor to study citrate formation in the mitochondrial organization. Already it appears powerful enough to show up the new point that L-malate may form an alternative path of entry to the classical oxaloacetate.

Some General Points

I have left the general points until the end. Summing up, I have shown how an attempt has been made in this instance to put therapy upon a logical basis by defining as clearly as possible the biochemical lesion. We have learnt that in fluoroacetate poisoning we have a unique case at present, in which a compound penetrates two permeability barriers, that of the cell and of its mitochondrial constituent, and is

then synthesized by the organized enzymes present into a fluorocitric acid which cannot during life easily leave the mitochondria. Put dogmatically, it is a case of lethal synthesis, in which the effect of the toxic agent is magnified by the structural biochemistry of the cell. It is a protective synthesis in reverse, and must be distinguished from toxic conversions, of which several examples could be quoted. From the proved reversal of arsenical poisoning by British anti-lewisite, there is no theoretical reason why an antidote should not be able to cope with the double permeability barrier, because this must happen when dimercaptopropanol removes arsenic from the cells. Unfortunately, the latter still remains the only example of a therapeutic agent developed on logical lines from biochemical principles; because, in fluoroacetate poisoning, though we now know more definitely what must be done for reversal, this knowledge has only intensified the puzzle and difficulty of reversing the biochemical lesion.

On the other hand, if we can catch it in time, we now have good biochemical reasons for the therapeutic use of substances which can prevent the entry of fluoroacetate into the tri-cycle. In so far also as citric acid accumulation is induced in the poisoning, it is a medico-legal point that we have some means of detecting the criminal use of such a substance of this type, though the estimation should be done soon after death; thus biochemistry has aided forensic medicine.

In a way, in so far as the virus grows inside the cell, it much resembles the large cell granule; hence in the case of this obscure poison attacking the mitochondria we have a somewhat close analogy to what we should like to do with the intracellular virus. In one case, indeed, low concentrations of fluoroacetate have been used to inhibit the production of influenza virus in the lungs of mice. At any rate, we know that there are agents, like chloramphenicol, which are toxic to the virus and must be able to penetrate to it. There is a valuable thought here for cancer research, which has been exploited in part by the attempt to synthesize radioactive substances which will specifically attack the cancer. It may be noted that 5-fluoronicotinic acid has been found by Hughes (1952) to stop bacterial growth by inhibiting cozymase synthesis; this may well turn out to be a case of a lethal synthesis.

No longer need therapeutic medicine be the slave of empiricism. Though the failure of the logical approach has so often in the past led to total discouragement, there must come the time when the biochemical complexities in living matter are sufficiently understood and related to the physiology to enable a start to be made. From work in the last 25 years it can be claimed that there are signs of a change based upon improved knowledge of the intracellular enzymes and their collective functioning.

I know that much of medicine must remain an art, and that it would be indeed somewhat dull if it all became a science. These biochemical analyses take a long time, I fear, and are only too apt to give the impression that the biochemist fiddles while the disease does its work. Yet I believe that each case thoroughly studied teaches us much and will accelerate our advance to the goal of logical therapy.

I wish to express my thanks to the President and Council for the great privilege of delivering this lecture. I am also grateful to the Chief Scientist, Ministry of Supply, for permission to quote work by Dr. Rivett, and to the Editor of the *Journal of Ecology* for permission to publish; and to the Editor of the *Proceedings of the Royal Society* for permission to reproduce Fig. 2.

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SUBCONVULSIVE ELECTRICAL STIMULATION IN TREATMENT OF CHRONIC NEUROSIS

BY

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A certain proportion of patients seen at a psychiatric out-patient department are ill enough to require more intensive treatment than superficial psychotherapy and advice. This group includes patients with severe anxiety and psychosomatic symptoms such as tachycardia, epigastric pain, asthma, stammer, etc. Others are unable to free themselves from some antisocial habit, such as exhibitionism, while others have become ill through some frightening experience. It is often impracticable to send such cases to a mental hospital, and so some more radical form of treatment such as intense abreactive therapy may be employed. This development is largely due to the work of British psychiatrists, particularly Horsley (1943), and its use has widely spread in different countries. Sargant (1949) has described in detail the emotional outbursts which can characterize the changeover from the neurotic reaction pattern to a more normal adjustment. Many of the drugs used for this purpose, however, have certain disadvantages. Barbiturates, for instance, may merely make the patient sleepy, while amphetamine is apt to be too lasting in its excitatory effects. Treatment with carbon dioxide is often refused by the patient, as it is so unpleasant.

One of us (A. S. P.) was therefore interested to observe in the Veterans Hospital, Lyons, New Jersey, in 1950 the use of an electric current of low intensity applied to the heads of patients after light anaesthesia. In about 80% of cases the patient showed a marked emotional response, which was generally in the nature of weeping and sobbing, and only occasionally of rage (Alexander, 1950; Hirschfeld, 1950). The Reiter B machine was used by these workers, and one of these instruments was brought back to this country. This is therefore a preliminary paper reporting our findings with this treatment, which could also, however, be administered by any electronarcosis apparatus.

Technique of Treatment

No description of the mechanism of the Reiter machine has been published. An examination of the wave-form on a cathode-ray oscilloscope, however, showed that it delivered a unidirectional interrupted current, the wave being very variable in shape, with many spikes which were half a millisecond in duration—that is, below the chronaxie for the larger cortical neurones. The frequency was variable, but was equivalent to about 40 effective pulses a second. The B3 current which we used had an intensity three times greater than that of B1. We also used a machine which provided alternating current similar to that used for electronarcosis, but with an ammeter which reads accurately between 1 and 50 mA. (A serviceable machine is obtainable from the Malven Electro-Medical Laboratories, Ltd., 423a, Hertford Road, Enfield, Middlesex.) In what follows reference is made to the strength of current as read on the Reiter ammeter, and also to the equivalent reading on an A.C. machine.

About 0.5 g. of thiopentone is given to a 10-stone (63.5 kg.) man, and the electrodes are placed just above and in front of the ears; if necessary a little hair can be cut. Nickel-plated electrodes are used, with lint well saturated with normal saline or sodium bicarbonate solution after the skin has been cleansed with "ether-meth," and after electrode jelly has been applied. Atropine, 1/100 gr. (0.65 mg.) is advisable either subcutaneously or intravenously. An airway should be used.

With the electrodes in position, 50 to 60 mA A.C. (10 mA Reiter B3 current) are passed through the patient's skull. This causes a flexion of the arms at the elbows and of the legs at the knees. At the same time respiration is inhibited. If this current is maintained respiration will start again after a period of between 30 and 45 seconds. If cyanosis is marked the current can be lowered at the end of about 30 seconds and then gently raised again. In some cases respiration recommences after about 10 seconds with 60 mA A.C. The flexion of the elbows and knees during the passage of this higher current is caused by stimulation of the motor tracts at the level of the internal capsule.

It may be remarked here that, if the current is raised to about 140 mA A.C., in nearly every case this has an anaesthetic effect, and in some cases if this current is given for 20 to 30 seconds a convulsion will be caused by a spread of the excitation to the motor cortex.

After 60 to 120 seconds, if the current is about 60 mA A.C. (10 mA Reiter B current), the patient may raise a hand towards his head as if to remove an unpleasant stimulus. When this is done the current is gradually lowered. The patient may again raise his hand as the effect of the thiopentone wears off, when the current is again lowered. During this part of the treatment the strength of current is not sufficient to stimulate the diencephalon. The current, however, is tending to make the patient wake up, and it is also stimulating certain autonomic structures outside the brain. The stimulation of the skin on both sides is also tending to cause some pain to the patient, who is just below or at the threshold of full consciousness. It is possible that this pain is a factor in causing the patient to show excessive emotion when he awakes; nevertheless, we do not obtain as good therapeutic effects if we do not initially give a current sufficient to stimulate the diencephalon itself. As the patient appears to be waking up he is asked to squeeze the physician's hand, and when he responds in this way the electrodes are removed. The whole treatment may last 3 to 15 minutes.

In a typical case the patient then remains in repose for up to about half a minute, but soon begins to shiver and tremble, and there may be marked sweating. Then he begins to weep or even becomes affected by convulsive sobbing. This may last as long as 20 minutes. During this time he may discuss at great length some emotional conflict related to his maladjustment. In other cases the patient, though weeping, is unable to relate the affect to any particular subject. In still other cases the emotional release is not one of sobbing but of great excitement, during which the subject relives some terrifying experience in the war. The patient may have described the event previously in an unemotional manner, but during the abreaction he may be unaware of his surroundings and relive the experience emotionally. In one case the patient, a British soldier, had been recaptured after escaping from a prisoner-of-war camp and had been thrown into a concentration camp. During his treatment eight years later he became wildly excited and threshed about with his arms in a fierce struggle with his supposed gaolers. We made some sound records of these events.

Other patients are in a euphoric state after the application of the current. They often express relief at being free from their haunting fears and discuss their symptoms and emotional problems fully. At this stage the patient often expresses gratitude that he can do this. He is in a highly suggestible state, a fact that can be exploited therapeutically.

The number of treatments varies according to the gravity of the symptoms and also to the nature of the abreaction. In some cases it may be carried out once only as an incident in the psychotherapeutic management of the case, while in others treatment is given every other day for ten times. With each treatment the violence of the abreaction tends to decrease.

If the subject is an out-patient he can go home after an hour or so. The treatment is less disturbing than E.C.T. It appears to be without danger. The chief risk is that of electric burns, especially if a relatively high unidirectional current is used. These can, however, be avoided if care is taken that the electrodes are non-polarizable. There should be plenty of conducting jelly. The use of sodium bicarbonate, suggested by some workers, does not seem to be superior to normal saline. The chief causes of burns are sparks, which can pass only if there is much resistance at the electrodes. This is apt to occur if the apparatus employs a specially high voltage and if rust causes some resistance at the electrodes.

In this treatment, if an intravenous anaesthetic is used it is advisable to have a closed oxygen circuit with a rebreathing-bag, so that if there were any prolonged inhibition of respiration before or after the application of the electrodes artificial respiration could be applied.

Physiological Considerations

When the patient has been anaesthetized with thiopentone the current is raised to about 50 to 60 mA A.C. (about 10 mA on the Reiter ammeter, B3 current). This appears to be about the threshold for stimulating the brain itself, for if electrodes are placed on the motor area, then there is a movement of a limb on the side contralateral to the negative electrode. With rather higher currents (about 80 mA, or 12 mA Reiter B3) both arms and legs may be contracted by stimulation of the pyramidal tracts probably about the level of the internal capsule. If the current has a low frequency—for example, 10 effective beats per second—then the muscles are seen to jerk synchronously with the current pulse. If this stimulation is prolonged and the current spreads to the motor area of the cortex, then a fit may occur. With the level about 50 to 60 mA, however, the optimum results are obtained. When the current is lowered below the threshold for brain stimulation some motor phenomena persist, such as a rhythmic contracture of the facial muscles, the platysma, and the trapezius muscles. This is caused by stimulation of the seventh and eleventh cranial nerves as they leave the skull. When the muscles contract through stimulation of the motor cortex, however, the movements are smoother, as in a voluntary contraction.

There is also stimulation of the autonomic nervous system, which in some cases is very pronounced. Further work may indicate that this is the essential factor in producing the therapeutic effect. If atropine is injected before treatment, overaction of the vagus, which is stimulated on both sides as it leaves the skull, is diminished. Sometimes a sympathetic effect like dilatation of the pupils and quick-

ening of the pulse is followed by vagal effects. More often, however, flushing and sweating of the skin are seen, as also are slight dilatation of the pupils and a rise followed by a slow fall of blood pressure, often reaching in time a subnormal level. A current of 60 mA will for a time inhibit respiration by approximation of the vocal cords from stimulation of the vagus. This effect is also lessened if atropine is given beforehand.

Although shivering and weeping occasionally occur when thiopentone is given alone without a current, these effects are brought out more frequently and more markedly by the addition of electrical stimulation.

Occasionally, after the early treatments a patient complains of a certain degree of nausea, or of an increase of mental depression, or of a feeling of malaise lasting a day or so, although the last is very rare. As a rule, however, the relief of tension easily outweighs any transitory feeling of malaise.

Electroencephalographic Studies

Thirteen patients had an E.E.G. taken before treatment and in only two cases was it normal. Two of the 11 abnormal cases showed tracings suggestive of epilepsy. In each of the other nine the E.E.G. was characteristic of tense unstable individuals.

Roth (1951) has described changes in the E.E.G. which occur in a high proportion of cases of depression just at the stage in E.C.T. treatment when the patient is conscious of subjective improvement. We were therefore interested to see whether similar results would appear with subconvulsive electrical stimulation. Five patients were tested at intervals during this type of treatment. The only case, however, in which the E.E.G. changes described by Roth occurred was that of a married woman aged 29 who had suffered for many years from severe anxiety with obsessional fears of impending disaster, so that she would repeatedly go back to see if she had left the gas on or a door open. She was in a perpetually tense state. However, during treatment she described herself as becoming more relaxed and as being in better health than for four years. Coincident with her improvement she showed the changes in the E.E.G. described by Roth.

Further study, then, is required to ascertain whether the Roth phenomenon occurs in a high proportion of patients treated with subconvulsive electrical stimulation, as only one in five of our cases showed the change.

Clinical Material

Our clinical material consisted of 50 (27 male and 23 female) relatively young subjects, 21 aged 20–29, 18 30–39, 7 40–49, 2 in the fifties, and 1 each in the subsequent two decades. In some cases only one treatment was given, but the most usual number was five. Two patients had 17 and a few 10 or over. The total number of treatments was 252.

Although on the whole relatively young, most patients had been ill for a long time: 43 (86%) had been ill for over four years, 6 (12%) for one to four years, and 1 for less than a year.

Special attention was paid to the question whether a terrifying experience had been a factor in the onset of the neurosis: 11 (22%) had been subjected to one or more terrifying experiences in wartime, while 10 (20%) had suffered a severe emotional trauma in civilian life. Attention was paid to whether the patient re-enacted the event with a release of emotion and whether the incident was in any way related to his current conflicts and symptoms.

The series included 15 patients (30%) who had acquired abnormal sexual or other antisocial habits, some of a criminal character. In the ordinary way it is difficult for a psychiatrist to induce such patients to talk freely about their problems. If, however, at a comparatively early stage in treatment the patient could be induced to discuss his problems freely, there would be considerable saving of time.

On the whole the patients were emotionally tense individuals who complained of various psychosomatic symptoms, the commonest of which was the feeling of a weight on the top of the head, or as if the head was held in a vice. Other symptoms in order of frequency were trembling feelings or "wobbly legs," over-sensitivity of sound, generalized weakness, indigestion, faintness and giddiness, ejaculatio praecox, and backache. More serious conversion symptoms were attacks of asthma or of severe epigastric pain without an ulcer, severe tachycardia, eczema, Raynaud's disease, writer's cramp, and severe stutter. The actual clinical groupings were:

Psychopathic behaviour disorders	10
Neurasthenics	4
Hysteria	17
Anxiety states	7
Obsessionals	7
Schizophrenics	4
Agitated melancholic	1

Three of those diagnosed as obsessionals had severe washing mania. Ten psychoneurotics with other diagnoses also complained of obsessional symptoms. Five psychotics were also included, four being schizophrenic and one an agitated melancholic.

Results of Treatment

The characteristic effect of the treatment was to produce a highly emotional state of mind, most often weeping, so that the patient eventually became less tense and lost his psychosomatic symptoms. The most remarkable phenomenon was the manner in which patients talked freely about their personal conflicts. One patient who was shy and awkward with women spoke of his fears that his genitals were so small in size that he would be ashamed to marry. Case 2 (see below) lost his urge to interfere with young girls. Another man whose personality had greatly suffered from war strain had developed an urge to exhibit himself at a window, and this also cleared up.

Some patients used exaggerated language to express the relief experienced on the day following this treatment. One described it as "bliss," and another as "the happiest day of his life." It must be emphasized, however, that the treatment was not necessarily curative in itself, but it permitted the psychiatrist to establish good rapport with the patient and to utilize this for subsequent therapy.

Thirty-eight patients (76%) said that they felt at once a certain relief from the treatment. Only 25, however (50%) have shown a marked improvement since the treatment, lasting up to the date of writing—that is, from six months to two years. In some cases severe physical symptoms such as asthma, tachycardia, and severe epigastric pain cleared up.

Attention was paid to the problem of whether patients who had incurred a severe mental trauma either in wartime or in civilian life eventually did better than the others. There were, in fact, 11 cases in which terrifying war experiences had been an important aetiological factor. Nine of these re-enacted their traumatic experience, some of them in a trance-like state, as described above. In the whole group the abreaction took the form of weeping more often in women than in men (16 out of 23 women, and 11 out of 27 men). Another reaction was euphoria, sometimes with laughter, while others showed rage. The reaction depended partly on temperament and partly on the original experience. The mode of reaction could be suggested to the patient. Thus a man who was weeping could be made to show aggression if appropriate noises were "heard off." Similarly, a man in a state of rage could sometimes be quieted by a gentle voice. There were 10 cases in which the trauma occurred in civilian life, such as sexual assault or a sudden bereavement. The abreactions in these cases were not on the whole so violent.

All these patients were found to have current problems which were instrumental in causing them to prolong an anxiety state which had started in the war or to revert to an anxiety state which brought their war experiences back to their minds again. The treatment facilitated the subsequent resolution of these problems.

It was found that those cases which showed a strong abreaction had a better end-result than those who failed to react, although there were some notable exceptions to this rule. The following figures seem to indicate that a good abreaction to an emotional trauma was of good prognostic significance : the 21 best results in the whole group included 7 out of 11 cases that had abreacted a wartime trauma ; the 13 worst results were on the whole characterized by a poor emotional response and poor rapport.

Even in the cases of two schizophrenics who had failed with insulin-coma therapy this treatment was useful. One of these became much less tense and for a time at least almost lost a severe stutter. In another case the diagnosis of a doubtful schizophrenia was confirmed only when the patient during this treatment expressed grandiose ideas that he was one of the great intellectuals of the age and fit to associate only with them.

Cases which failed to respond included schizophrenics, a mentally retarded patient, and an alcoholic dement.

With regard to obsessional illness, there were three compulsive hand-washers. On one of these the treatment had no effect and he subsequently had a leucotomy. The second, who had a depressive background, reacted better to electronarcosis. In the third case, however, the patient, who had been ill for some years, gave up a practice of spending half an hour washing himself after urinating. He returned to work after an absence of many months. He had intensive psychotherapy as well. There were 15 others who had obsessional symptoms of less pronounced degree in a setting of anxiety with psychosomatic symptoms.

Of the nine patients who did best, four were classified as hysterics, four as psychopaths (two being homosexuals), and one as a chronic anxiety case. Four of these had obsessional symptoms—one being the washer mentioned above, one had a "going-back" mania, one was ruminative, and one was a claustrophobic with fears of being shot in the street.

Illustrative Cases

The following two case histories indicate what results can follow the treatment : Case 1 illustrates how a patient may relive horrific experiences during the treatment, and Case 2 shows the successful treatment of an aggressive egocentric psychopath who was a parasite on society and who could not give up the practice of interfering sexually with young girls.

Case 1.—A male clerk aged 30 was first seen on July 7, 1947. He had developed an anxiety state two years previously, with recurrent feelings of pressure on the head, giddiness, tremors, and inability to concentrate. He could give no account of why the illness should have started at that time. No progress was made with the usual psychotherapy, and on January 6, 1948, he was given narcoanalysis, when he relived a terrifying experience in an air raid at Canterbury during the war. On this treatment he improved for a time, but a year later he appeared to be depressed and was given some treatments with electro-shock, with only transitory improvement. On July 7, 1951, he was given electrical stimulation, when the abreaction was more intense than that previously experienced. This time he expressed intense feelings of guilt for the death of three young soldiers in the raid, as they had been carrying out his orders at the time. On four subsequent occasions the same scene was relived and the incidents were discussed, until finally he stated that he had lost his feelings of tension, pressure on the head, giddiness, etc. He was later able to carry out his work efficiently.

Case 2.—A man aged 36 had suffered from severe mental tension for some years, complaining of giddiness and inability to go out alone. He had no intention of undertaking steady work. He had hitherto been teaching pupils to play the piano, but attempted to behave indecently to one young girl. He had decided to become a photographer, with vague ideas that he might photograph girls in the nude. He stated that he had been rejected for military service. He was first seen on February 21, 1951, as fits of depression had caused him to consider suicide. His wife stated that he was aggressive at home, and on one occasion had put his hands round her neck threatening to strangle her. She stated, however, that she was quite prepared to remain longer with him to give him a chance to have treatment. She stated that the patient's father had been killed in 1916 as a soldier, and that the patient had been brought up to be completely self-centred. During the treatments with electro-stimulation he was able to show great emotion and achieve a close rapport with the psychiatrist. He was able to describe how between the ages of 14 and 16 he had regularly had coitus with his young sister, who was 10 at the beginning. Since then he had been obsessed with the idea of sexual intimacy with young girls. He also related how in the second world war, with his mother's co-operation, he had run away and lived in hiding to avoid conscription. In the course of treatment he was able to discuss how his emotional development had gone wrong. He was able to lose his narcissistic attitude and develop as a member of the community. By the end of six lengthy treatments at weekly intervals he was on good terms with his wife and had lost his severe feelings of tension. He has since obtained a promising position.

Discussion

From our experience with this treatment we would agree with American workers (Alexander, 1950; Wilcox, 1951) that it is of value in treating tense anxious psychoneurotics. It is necessary, however, to draw a distinction between the effect of passing a very low current (for example, 3 mA Reiter B1 or 10 mA A.C.) and the effects of passing a higher current which is strong enough to penetrate to the diencephalon (for example, 12 mA Reiter B3 current or 60 to 100 mA A.C.). In the former case, as the current is not strong enough to excite the brain there is merely stimulation of cranial nerves as they leave the skull. For instance, excitation of the seventh nerve causes twitching of the face, of the ninth salivation, of the tenth slowing of the heart and inhibition of respiration, and of the eleventh twitching of the shoulder. On the other hand, the stronger current actually passes through the diencephalon, as judged by the fact that this current excites the motor tracts at the level of the internal capsule, so that the arms and knees are flexed.

If a low current of only 10 mA A.C. is used the patient may show excessive emotion as he wakes, but this effect may result only from the painful stimulus on the forehead at the site of the electrodes. This effect, however, has not, in our experience, the same therapeutic value as when one gives a current which is strong enough initially to stimulate centres in the diencephalon. We obtained the best results only when we raised the current to this level. This matter is of some importance, because one American worker (Bennett, 1952) has stated that the low-current therapy is not superior to simple psychotherapy. This subject is fully discussed by Spencer Paterson (1952).

Summary

A series of 50 patients, mostly young adults who had suffered from chronic neurosis and in whom the usual forms of treatment had failed, were subjected to a new form of electric abreactive therapy. Nearly all were emotionally tense and anxious. In all, 252 treatments were given.

The machine first employed was the American Reiter machine, but any electronarcosis machine would appear to be equally effective.

The technique of the treatment is described. It is safe and not unpleasant for the patient. The current was intense enough to stimulate the diencephalon, and it is thought likely that excitation of emotional centres was related to the therapeutic effect. Side-effects, such as stimulation of certain cranial nerves and of subcortical motor tracts, are described.

In six cases E.E.G. studies were carried out to ascertain if the phenomena described by Roth as occurring in the electric shock treatment of depression would occur. The change was seen in one case out of six, and at the point when a striking clinical improvement occurred in a woman suffering from obsessional illness.

With this unpromising material it was possible to obtain a much closer emotional rapport than by using other forms of abreaction. The patients would show great emotion, and discuss previously repressed material relating to their conflicts in the frankest manner and with great emotion. In some cases the patients were able to free themselves from antisocial sexual habits of a criminal character.

In cases in which horrific war experiences had been a causal factor the patient relived the incident with marked emotional expression of fear and rage. A strong abreaction was of favourable prognostic significance.

Thirty-eight (76%) patients stated that they had received immediate emotional relief from the treatment. Twenty-five (50%) have shown an improvement lasting from six months to two years. Illustrative cases are given.

The treatment has been found valuable in conjunction with psychotherapy in treating chronic cases of neurosis and behaviour disorder, and may be superior to other methods of abreactive therapy.

One of us (A. C.) is grateful to the Dan Mason Research Foundation for a grant to carry out work of which the present study forms a part. We acknowledge advice on questions of neurophysiology from Professor T. Gualtierotti, and of anaesthesia from Dr. A. H. L. Baker. We are also grateful to Dr. B. G. Parsons-Smith for his advice on electroencephalography.

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ACUTE PORPHYRIA

EXPERIMENTAL TREATMENT WITH A.C.T.H.

BY

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In the past two decades the clinical study of the porphyrias has received growing attention. The aetiology of these diseases, however, remains obscure and their treatment symptomatic. It was perhaps inevitable that a new therapeutic agent, such as A.C.T.H., would be tried in the treatment of this puzzling group of diseases, particularly as it has been suggested that there may be some connexion with hypofunction of the adrenals. Myerson (1951) and Oltman and Friedman (1951) did not find A.C.T.H. of value in this condition. This paper reviews the clinical features of two cases of acute idiopathic porphyria, in one of which a course of A.C.T.H. was given.

Case 1

A man aged 28 was admitted to the Western Infirmary, Glasgow, on February 21, 1946, suffering from severe abdominal pain; he gave a history of four previous attacks of abdominal and limb pain. His first bout was in September, 1944, when he was serving in the Royal Air Force, and his condition was diagnosed in an R.A.F. hospital as idiopathic porphyria. He had been a coal-miner before joining the R.A.F., and had had no previous ill-health. There was no family history suggestive of porphyria.

Since February 21, 1946, six further attacks were observed in the Western Infirmary, and he was admitted on numerous occasions to Ayr County Hospital. Dr. R. Hill is publishing observations made on this case while under his care in the latter hospital. Some episodes of porphyria were characterized by abdominal pain only, but several showed both colicky pain and polyneuritis. They varied in duration from a few days to a month.

A typical bout observed in the Western Infirmary and beginning on September 22, 1946, had the following features. While in apparently good health, the patient noticed that his urine became darker in colour. Within a few hours generalized abdominal pain developed; the pain was continuous and was punctuated by frequent bouts of colic of great severity. At this stage the abdomen was as rigid as in a case of perforated peptic ulcer. He was constipated and his urine became scanty and reddish black in colour. A persistent tachycardia up to 150 a minute was present, and the blood pressure rose to 170/130 (his normal blood pressure was 120/90). Within one week the abdominal pain subsided and was succeeded by pain in the thighs, with marked spasm of the abductors and hamstrings. The pain spread to involve the muscles of all four limbs, which showed hypotonicity, pronounced wasting, and diminished tendon reflexes. No loss of vibration or tactile sense was noted, but the muscles were very tender. This polyneuritic phase lasted three weeks. The pain gradually lessened during the final week, and this was accompanied by reduction in the intensity of the urinary coloration. Convalescence was rapid when the pain subsided.

During the acute stages of a few attacks mental confusion and hallucinations were noted. Staphylococcal skin infections were common, and in one episode bronchopneumonia developed (September 10, 1948). The patient stated that during his attacks he tended to become "blue in the face." Body weight fell by about 30 lb. (13.6 kg.) during each attack, but weekly records failed to demonstrate any weight loss before the onset of pain.

Investigations.—Repeated clinical and laboratory investigations were carried out during the attacks, and the following abnormalities were found: (1) The patient continuously excreted uroporphyrins, almost entirely the Series III isomer, with a marked rise in excretion during acute attacks. The isomer type was established by partial decarboxylation and separation of the resulting mixture of coproporphyrins. (2) The plasma chlorides fell to levels around 0.52 g.% (as NaCl) during attacks. (3) Liver-function tests showed some impairment of hippuric acid synthesis.

Treatment of the acute attacks by intravenous calcium gluconate, by saline and glucose-saline, or by the injection of whole adrenal extracts ("eucortone"), of D.C.A., and of B-group vitamins produced no significant improvement. The symptomatic treatment of pain required large doses of morphine-type drugs over long periods.

At the time of writing the patient's condition is satisfactory, though his urinary porphyrin excretion is still above normal and includes uroporphyrin. Recently the episodes have consisted of mild attacks of abdominal discomfort of a few hours' duration, occurring every three to four months. The attacks are adequately controlled by minor analgesics, and he is able to work as a storeman.

Case 2

A single woman aged 21, a whisky-bond worker, was admitted to the Western Infirmary, Glasgow, on January 19, 1951, because of lower abdominal pain, nausea, vomiting, and constipation of two days' duration. The pain was constantly present, but became more severe and colicky at times. She had been normally active and healthy until two months before her admission to hospital, but since then her mother thought she looked "thinner in the face" and was not so active as previously. So far as could be ascertained she had taken no drugs in the past few months. There was nothing of note in the family history.

On admission the patient was anxious, was crying, and was in great pain. A noteworthy feature was that her lips, ear-lobes, and finger extremities were cyanosed and remained cyanosed for about three to four days. Her temperature was 100.2° F. (37.9° C.), pulse rate 140, blood pressure 150/115, and white blood count 8,200 per c.mm. General physical examination revealed no abnormal signs except some slight generalized abdominal tenderness. There was no rigidity of the anterior abdominal wall.

On the day after admission her abdominal pain remained very severe and she was still vomiting. It was noted that her urine was rose-brown in colour, and gave the spectrum characteristic of porphyrin. The reaction of the urine to Ehrlich's aldehyde reagent was strongly positive. The pain continued for two days, then diminished greatly in severity as she began to menstruate on January 22, 1951. For the next month she had little abdominal pain, but complained of shooting pains in the medial aspect of both thighs. She was up and about the ward, her blood pressure had returned to normal (115/80), and her urine was clear.

On February 19, about one month after her admission and just before her expected period, she started a prolonged and severe attack with almost constant abdominal pain, and with tachycardia, amenorrhoea, and the passage of red-brown urine. In this phase, lasting about six weeks, she lost 28 lb. (12.7 kg.) in weight. There was marked and progressive mental deterioration. She often screamed and shouted in the ward, had visual hallucinations, and threatened suicide. In order to provide relief she was given, on different occasions, opiates, chloral hydrate, paraldehyde, nicotinamide, diphenhydramine hydrochloride ("benadryl") methylene blue, kaolin, and intravenous calcium gluconate. With the exception of the opiates, chloral hydrate, and paraldehyde, these drugs did not seem to benefit her.

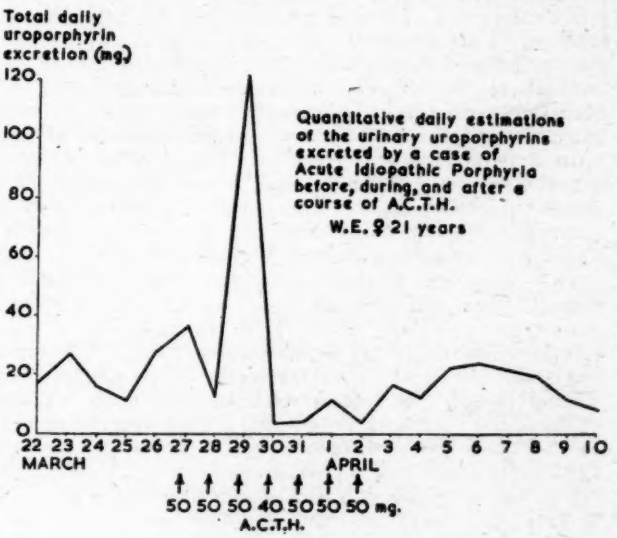
By March 27 her general condition had become very poor. She was weak, hypotensive (B.P. 70/54), somewhat dehydrated, and still in agony with abdominal pain. Up to this time she had required large doses of sedatives, and this aggravated the dehydration. She was given 1½ pints (850 ml.) of normal saline by a subcutaneous drip (using hyaluronidase, 9 mg.) and began a course of A.C.T.H. A daily dosage of 50 mg. was given for one week, in six-hourly injections of 12.5 mg. intramuscularly. Her general condition improved within one or two days, and her blood pressure rose to 120/100. She required less sedatives, and thus was able to drink more, and the urinary output improved. She became euphoric and excited at times and began to sing to the other patients. Her physical condition improved slowly, and, although she still passed reddish urine and was still depressed and unstable, she was allowed home on April 19. Three months later she was free from pain, had put on weight, and had almost returned to her normal mental state.

Investigations

Blood examination resulted as follows: Hb, 11.4 g.%; red cells, 4,280,000 per c.mm.; P.C.V., 43%; M.C.V., 100 μ^3; M.C.H.C., 27%; white cells, 7,400 per c.mm. (neutrophil polymorphs 80%, lymphocytes 17%, eosinophils 2%, basophils 1%); reticulocyte count less than 1%; icteric index, 3 units; E.S.R. (Westergren), one hour 4 mm., two hours 7 mm. Film showed no abnormality. The blood picture showed no change on repeated examinations during her stay in hospital. The Coombs test and red-cell-fragility test were normal. Repeated estimations of serum sodium and chlorides before, during, and after A.C.T.H. administration were normal. Alkaline phosphatase was 7 King–Armstrong units; cephalin flocculation and colloidal gold tests were negative; total plasma protein 6.85 g.% (albumin 4.57 g.%, globulin 2 g.%, fibrinogen 0.28 g.%); non-protein nitrogen, 36 mg. per 100 ml.; blood urea, 34 mg. per 100 ml.; van den Bergh reaction, negative; blood cholesterol, 165 mg. per 100 ml. The electrocardiogram and the *x*-ray film of the chest were normal.

The adrenaline–eosinophil test (Recant *et al.*, 1950) was carried out on two occasions. On March 19 the eosinophil count changed merely from 248 to 246 per c.mm. four hours after the subcutaneous administration of 5 minims (0.3 ml.) of 1:1,000 adrenaline hydrochloride. This was repeated three days later and showed a drop from 181 to 137 per c.mm. four hours after the subcutaneous injection of 7 minims (0.42 ml.) of 1:1,000 adrenaline. After A.C.T.H. was given on March 27 her eosinophil count fell from 147 per c.mm. to zero in four hours.

The urine contained uroporphyrin, mainly of Series III. An amyl alcoholic extract of the urine was very fluorescent under ultra-violet light. Quantitative estimations of the total daily urinary uroporphyrin excretion before, during, and after A.C.T.H. therapy were carried out after preliminary heating of the urine at *p*H 4.8 as described by Grieg *et al.* (1950). The results were as follows (see Graph):


Total daily uroporphyrin excretion (mg.)
120
100
80
60
40
20
0
Quantitative daily estimations of the urinary uroporphyrins excreted by a case of Acute Idiopathic Porphyria before, during, and after a course of A.C.T.H.
W.E. ♀ 21 years
22 23 24 25 26 27 28 29 30 31 1 2 3 4 5 6 7 8 9 10
MARCH
APRIL
50 50 50 40 50 50 50 mg.
A.C.T.H.

Comment

These two cases conform to the usual clinical picture of acute idiopathic porphyria. In Case 1 there were numerous episodes over a period of seven years, and in the second case two attacks occurred in three months. Thus the condition is often a subacute or chronic one, though it may appear acutely in its presenting phase.

The age of onset—22 years in Case 1 and 21 years in Case 2—is typical of this disorder, which usually begins in the third decade. In both cases the presenting features were acute colicky abdominal pain associated with tachycardia and hypertension. Definite board-like rigidity occurred in Case 1 but not in Case 2. Grossfeld (1951) and Chandler *et al.* (1939) reported cases in which the abdominal signs were such that laparotomy was performed.

Pain in the limbs occurred in both patients, but manifest neurological signs were present only in Case 1. In this case mild mental confusion and hallucinations occurred during acute attacks. In Case 2, on the other hand, there was a pronounced toxic psychosis; the patient's personality completely changed and only returned nearly to normal several months after the acute attack had settled.

During the acute phases weight loss was noted in both patients, but records taken in Case 1 failed to demonstrate the pre-episodic fall stressed by Discombe and D'Silva (1945).

Cyanosis of the extremities, and especially of the lips, was striking in Case 2, while Case 1 was described as becoming "blue in the face" during attacks. Similar cyanosis has been described by Turner (1938). Venous blood from Case 2, examined during this cyanosed phase, did not contain methaemoglobin, and a short course of methylene blue, given empirically, had no apparent clinical effect.

The dramatic fluorescence, under ultra-violet light, of urine containing porphyrins encouraged us to examine the skin of Case 2 under that light. Interest was aroused when tiny pin-points of intense rose-pink fluorescence were found on the naso-labial folds and on the anterior and posterior surfaces of the patient's chest. A few days later, however, it was found that the application of the proprietary talcum powder used by the patient produced similar fluorescence in a normal control. Abrahams *et al.* (1947) also failed to find skin fluorescence in their case of acute porphyria.

It is well known that a clinical state of hypotension with low serum sodium and chlorides may supervene in acute porphyria, although in some cases these changes are not observed. Abrahams *et al.* (1947) and Linder (1947) have suggested that this is due to adrenal insufficiency and have used eucortone in this phase, but without much success. On the other hand, Davies (1949) believes that these changes in electrolytes are due to renal causes. In Case 1 low serum chlorides were found, though no fall in blood pressure occurred during an attack. In Case 2, however, a profound state of peripheral circulatory failure developed, though no biochemical changes were revealed. Rawlings (1950) reported the case of a 22-year-old woman suffering from idiopathic porphyria who showed remarkable clinical improvement on becoming pregnant. The stimulus of pregnancy upon the anterior pituitary is well recognized, and Rawlings's report is also reminiscent of Hench's original observation on rheumatoid arthritis. It was felt, therefore, that a trial with A.C.T.H. was justified in Case 2.

The significance of the negative adrenaline test and the normal eosinophil response to A.C.T.H. is doubtful. According to Recant *et al.* (1950) adrenaline is a non-specific stimulator of the pituitary-adrenal axis. A positive test is said to suggest a normal response of the pituitary and adrenal glands, "but recent work has cast doubt on this interpretation" (Prunty *et al.*, 1951; Kark and Muehrcke, 1952). The normal response to A.C.T.H. in our case presumably indicates that the adrenals act in this respect normally, but our findings might suggest an anterior pituitary dysfunction. Further inference that acute porphyria is associated with endocrine changes might be drawn from the frequency with which attacks occur in the immediate premenstrual period, from the greater incidence of the disease among women, and, in our Case 2, from the patient's amenorrhoea, which has persisted for five months after the cessation of her symptoms of porphyria.

Clinically, the administration of parenteral fluid and A.C.T.H. undoubtedly improved Case 2 during her hypotensive phase. The effect of A.C.T.H. on porphyrin excretion cannot be judged on one case alone. The pronounced rise in urinary porphyrins on the third day of treatment followed by a lowered excretion during the period of A.C.T.H. treatment is of interest, but similar large fluctuations in daily porphyrin excretion have been recorded previously (Rimington, 1943); they render difficult the evaluation of any therapeutic trial. The mean daily uroporphyrin excretion during the periods immediately preceding and following the administration of A.C.T.H. were 19.6 and 14.4 mg. a day respectively. During treatment the mean figure was 31.4 mg. a day, or, if March 29 is excluded, 13.5 mg. a day. There is no indication, therefore, that the treatment with A.C.T.H. lowered the porphyrin excretion in this experiment. The drug may, however, be worthy of further trial in porphyria, especially in the so-called "adrenal insufficiency" phase of the disease, when this is present. Further experience by two of us (C. R. and A. G.) in the treatment of other cases of porphyria with A.C.T.H. leads us to conclude that the drug does not significantly alter the uroporphyrin excretion. In one case with persistently lowered serum chlorides (approximately 400 mg. per 100 ml., expressed as NaCl), unresponsive to added oral salt or parenteral normal saline, the administration of A.C.T.H. brought about a prompt and sustained restoration of the normal level (approximately 560 mg. per 100 ml.).

The presence of a toxic psychosis was considered as a possible contraindication to A.C.T.H. treatment. Towards the end of the week's course the patient became rather euphoric and excitable, and it was perhaps fortunate in this respect that A.C.T.H. was discontinued after seven days.

Sedation and the relief of pain in this condition present important and difficult problems. In both our cases opiates were used in large doses without any resultant addiction.

The prognosis is generally regarded as poor. Nesbitt (1944) remarks that the immediate mortality may be as high as 80 to 90% in acute episodes showing neurological manifestations. Happily, both our patients are now in good health. Case 1 is carrying on a useful job, and has recently been married. Case 2 is free from pain, is putting on weight, and has almost recovered her previous mental stability, five months after the cessation of her symptoms.

Summary

Two cases of acute idiopathic porphyria are described. One of them was treated with A.C.T.H. for a period of one week, but without any significant lowering of the mean daily uroporphyrin excretion.

The clinical manifestations and certain factors in diagnosis and treatment are discussed.

We wish to thank Sir John W. McNee and Dr. J. A. W. McCluskie for help in the preparation of this paper. The drug was supplied from the small allocation now made regularly to the Western Infirmary, Glasgow.

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Opening a conference on housing research in South Africa on November 17, the Minister of Health and Social Welfare, Dr. K. Bremer, said that housing in Africa had become an urgent problem. Increasing urban native populations now urgently required houses of a new standard. Estimated requirements for native housing were 350,000 dwelling units over the next 10 years at a cost of approximately £100m. Europeans also needed houses. The problem was not unique to South Africa, and most countries in Africa were experiencing similar difficulties. The National Building Research Institute was studying the problems, including how to reduce building costs.

OESOPHAGEAL SPEECH

BY

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It has been known for many years that speech may be regained after complete excision of the larynx and the establishment of a permanent tracheostomy; but, although efforts are often made to encourage and assist the patient to develop his "oesophageal" voice, little appears to be known of the mechanism of this remarkable accomplishment. The role of the cricopharyngeal sphincter was discussed by Negus (1938), and our observations largely support his suggestions.

This paper describes observations on three patients who had undergone complete laryngectomy, and who had well-developed oesophageal speech.

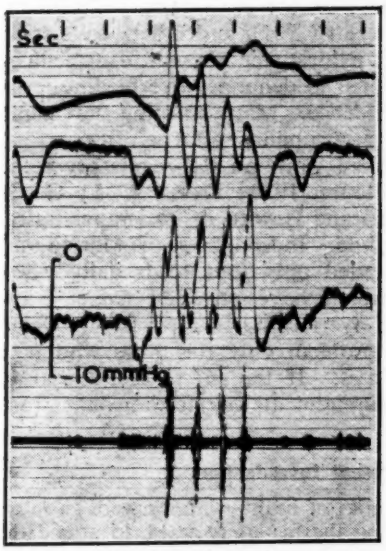

FIG. 1.—Oesophageal speech; counting four. The top tracing indicates the amount of air in the chest; the next the rate of airflow in or out of it. Inspiration causes a downward deflection of both. The other tracings are the oesophageal pressure record and the sound-track.

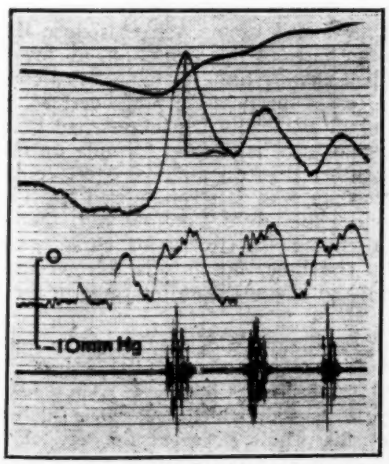

FIG. 2.—As in Fig. 1, but recorded at greater paper speed.

Methods.—Intra-oesophageal pressures and trunk movements were measured by the technique previously described by two of us (Dornhorst and Leathart, 1952). Sound (for timing purposes only) was recorded with a commercial amplifying stethoscope unit. The patients were examined by fluoroscopy, using barium paste to outline the oesophageal walls, and the appearances were in two cases checked by taking films.

Results

All three patients gave substantially similar results. During breathing the oesophageal pressure behaved normally, being maintained at a sub-atmospheric level and dropping further in inspiration. The pressure also behaved normally during swallowing. During speech the oesophageal pressure mounts steeply and rises well above the atmospheric pressure (Fig. 1). The sound is formed during the rise, and one may sometimes see a judder in the pressure trace corresponding to it (Fig. 2). The positive-pressure wave is accompanied by an expiratory movement of the chest and by an obvious expulsion of air through the tracheostomy. The patient can repeat the process about ten times, each effort producing one syllable; he must then pause and take a breath, as during this time his lungs have been progressively emptying.

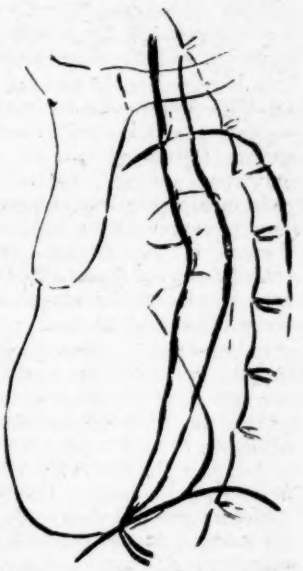

FIG. 3.—Tracing of a radiograph taken during oesophageal speech. The oesophagus, whose walls are outlined with barium paste, has filled down to the diaphragm.

Fluoroscopy shows that the oesophagus is usually empty and that swallowing is normal. Just before the patient utters a sound the oesophagus suddenly fills with air from the pharynx to the diaphragmatic opening (Fig. 3). During speech this air is expelled by a series of short expiratory efforts, several syllables being possible on one "fill." If air is left in the oesophagus the next swallow carries it into the stomach, which thus tends to become distended, but with experience the patient learns to avoid this.

For comparison, records taken during speech in a normal person are shown in Fig. 4. It will be seen that the pressure rise is less than in the patient and the chest is emptied less. The normal process is clearly more economical of both air and effort.

Discussion

From the data described, the mechanism may be inferred with some confidence. The cricopharyngeal sphincter is kept closed until the patient is about to speak. He then releases it, allowing the oesophagus to fill, which it readily does because of the negative intrathoracic pressure to which it is exposed, the rate of filling being further enhanced by a simultaneous inspiratory movement. The patient then closes the sphincter and raises the intrathoracic pressure by a sharp expiratory effort. The rise in oesophageal pressure forces some air through the sphincter, causing a sound which is then modulated by tongue movements, etc., in the usual way. The effective lower limit of the air reservoir is the diaphragm and not the cardia. Although some air enters the stomach this is a side-effect and there is no evidence that stomach air is belched out to form the speech sound. The rise in oesophageal pressure during speech is always accompanied by a sharp expiratory effort and loss of air from the lungs. There is therefore no need to postulate any

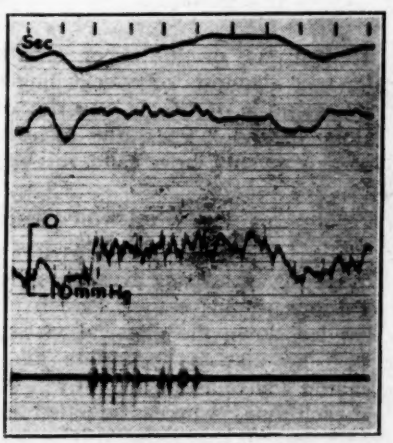

FIG. 4.—Normal speech: counting ten. The method of recording is similar to that used in Figs. 1 and 2.

activity of the oesophageal smooth muscle. We believe that the whole knack lies in the control of the cricopharyngeal sphincter, and that the oesophagus behaves as a passive tube.

It is surprising to find that a patient with no glottis can raise his intrathoracic pressure in the way shown. Such patients can, however, achieve positive pressures of 30 to 50 mm. Hg during sustained expiratory strain and considerably more during coughing. It appears that the effective resistance of the bronchioles to a suddenly applied expiratory pressure can be very high, so that in a sense air is trapped in the alveoli. Anyone who has witnessed a bronchoscopy will recall that the veins of the head and neck congest during coughing and straining even with the bronchoscope in place.

In acquiring a voice after laryngectomy the patient has to gain control of the cricopharyngeal sphincter so that he can first relax the sphincter and allow air to enter the oesophagus during inspiration, and, secondly, control the degree of contraction during speech so that there is maximum economy in the use of the air in the oesophagus and the loss of air from the lungs. To acquire a good oesophageal voice therefore comprises two stages : (1) finding the voice, and (2) learning to use the new technique economically so that many syllables can be uttered without taking a fresh breath. Finding the voice usually takes a month or two, and the skill in the use of this voice increases over several years.

Summary

Measurements of oesophageal pressure and chest movements during oesophageal speech have been made, and the oesophageal movements observed by fluoroscopy.

The mechanism is discussed. Air enters the oesophagus down to the diaphragm. It is expelled by expiratory effort, the airway resistance allowing the intrathoracic pressure to rise above the atmospheric pressure despite the presence of a tracheostomy.

We are grateful to Drs. J. W. Pierce and W. R. R. Thursfield for radiological help.

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OVERFEEDING IN EARLY INFANCY

BY

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The purpose of this paper is to record the number of times a diagnosis of overfeeding was made in the first two months of life in a series of healthy infants fed along orthodox lines, and to assess, by observing subsequent events, how valid this diagnosis proved to be.

Review of Literature

Overfeeding has been regarded as the main source of dyspepsia in infancy ever since Aristotle attributed convulsions to this cause. Pemell (1653), amongst others, handed down the classical views, but Cadogan (1748) was the first to appreciate that the breast-fed baby should " have as much as it will take out of both breasts at each time," whereas he pitied those who were " stuffed with pap till they spue." The word " overfeeding " has been used indiscriminately to mean faulty feeding or overloading with a suitable food—two very different conditions. The prevalence of gastro-enteritis in the nineteenth century stimulated Rotch (quoted by Morse, 1935) to dispense graduated milk mixtures for healthy babies as carefully as he prescribed a dangerous drug. For the same reason Cautley (1897) advised two-hourly feeds, but in 1915 Truby King objected that this method caused overfeeding. King's unbalanced views, which still influence many people to-day, are exposed in the following passage from his daughter's book (Mary King, 1941) : " Overfeeding, especially in the breast-fed baby, is the commonest and most frequent cause of digestive and nutritional disturbances in early infancy. It occurs far more often than is realized in the first weeks. Overfeeding is much more serious than underfeeding, because the results are very far-reaching, and may gravely undermine the baby's digestion and nutrition."

Many modern textbooks still state that overfeeding may lead to vomiting, diarrhoea, loss of weight, and death, yet there is not a single authentic case history to be found in the literature illustrating this unlikely sequence of events. Budin (1907) described five non-fatal cases, four of which were probably really infections. Pritchard (1929), Brackett (1947), and others have tried unsuccessfully to link pyloric stenosis with overfeeding. Smith (1939), determined to denounce overfeeding, provided questionable evidence. Many warning statements are to be found, but few supporting facts. In contrast, there is ample published work on self-regulatory feeding (Weinfeld and Floore, 1930 ; Davis, 1935 ; Gesell and Ilg, 1937 ; Aldrich and Hewitt, 1947) demonstrating the safety of this method. Indeed, 20% of Aldrich and Hewitt's series demanded only four feeds daily when orthodox methods would have provided five. They make no mention of overfeeding in their paper, which seems to become a problem only for those who take active steps to avoid it. If the infant is allowed to determine his own requirements overfeeding takes care of itself.

Present Investigation

The mothers of a series of healthy infants were given an appointment, on leaving the maternity ward, to attend the " well babies' follow-up clinic " during the second month for a check-up. Four-fifths (503) of those given appointments kept them, and 80% of the babies born to primiparae and 66% of the others had been taken to an infant welfare clinic on at least one occasion in the meantime.

At the first interview at the follow-up clinic each mother was asked whether her baby had been diagnosed as overfed since leaving hospital ; a definite diagnosis was considered to have been made if steps had been taken to reduce the size of the feed. On the basis of this definition, no fewer than 71 infants (14%) had already been treated for this condition. In a further 47 cases the possibility of overfeeding had been discussed, and 12 artificially fed infants had been changed from a full-cream to a half-cream formula on the grounds of qualitative rather than quantitative overfeeding. The question of overfeeding was therefore raised for 130 (26%) of the babies before they were 2 months old. None of the 503 infants attending the follow-up clinic were regarded as overfed at the time, but it was learned that several were subsequently so diagnosed on returning to their own welfare clinic.

For the 71 definite cases the mode of feeding at the time the diagnosis was made was as follows: Breast-fed, 51 infants ; bottle-fed, 16 ; and breast+bottle, 4. Thus 72% of these were wholly breast-fed, which is a little higher than the incidence for the whole series at the age of 2 weeks. There had therefore been no tendency to attribute

overfeeding to the unrestricted use of artificial-milk mixtures. The main symptoms leading to the diagnosis were :

Excessive gain or intake	19	infants
Colic and/or diarrhoea	12	,,
Frequent green stools	11	,,
Vomiting and/or posseting	11	,,
Crying	8	,,
Facial skin lesions	4	,,
Failure to gain	2	,,
Others	4	,,
Total	71	,,

It will be realized that many of these symptoms commonly occurred together, but the group of 19 good gainers and feeders had virtually no other symptoms.

The diagnosis was reviewed at the follow-up clinic in the light of the infants' subsequent behaviour after a reduction in the size of the feed had been made or attempted, and the 71 infants were reclassified as follows :

Probable past history of overfeeding	6
Possible ,, ,, ,,	11
Normal healthy infants	25
Underfed or unsatisfied	15
Crying infants	10
Neonatal infections	4

In only just over 1% of the original series had overfeeding definitely occurred. The 11 doubtful cases were difficult to classify conclusively because of the nature of the retrospective inquiry, but in most cases other explanations for the symptoms seemed more probable, though the original diagnosis has been accorded the benefit of the doubt. The reasons for the diagnostic errors in the remaining cases are discussed below.

A past history of underfeeding was also inquired into, and 122 infants (24%) had been so diagnosed. It is interesting to compare by whom the original diagnosis had been made in the underfed and overfed groups :

Diagnosis made by	No. of Infants in	
	Overfed Group	Underfed Group
Infant welfare clinic	49	26
Mother	8	85
General practitioner	9	5
Health visitor	4	2
Maternal grandmother	1	4
Total	71	122

Thus in 69% of the overfed group the infant welfare worker made the diagnosis, whereas 70% of the underfed group were originally spotted by their mothers. Pritchard (1914) observed that it was "very difficult to convince the lay mind that rosy cheeks and a fine weight record can be of unfavourable augury." Apparently welfare-clinic workers are still more easily disturbed by these signs than the mothers of such babies.

Discussion

Restlessness, frequent green stools, crying, vomiting, and failure to gain weight are symptoms common to both underfeeding and overfeeding (Toverud, 1925). Indeed, in nine cases the original diagnosis had been changed to underfeeding when the symptoms had been worsened by a reduction in the size of the feeds. It is therefore only by a careful follow-up that the validity of the diagnosis can be checked, and in this investigation in only 6 out of 71 cases was it definitely upheld. Of these six, five were being awakened for three-hourly feeds and were happier when allowed to sleep on, as they would have been on a self-demand regime. The sixth was troubled with screaming, vomiting, and the passage of frequent undigested motions, which dramatically improved when only one breast was given at each feed. The mother had had similar difficulties with her first two babies. This case constituted the only one in which a self-regulated intake would have failed, but the symptoms were never alarming.

The 25 infants reclassified as normal and healthy were simply babies in whom overfeeding had been suspected because of an excessive gain or intake, or mild digestive symptoms. Ignorance of the range of normal values in early infancy has largely been responsible for these diagnostic errors.

Excessive Gain.—Evidence has recently been compiled (Wickes, 1952) to show that the generally accepted rate of gain of 1 oz. (28 g.) daily or less underestimates the ability of the average young baby to grow. At some clinics this rate of gain was regarded as optimal rather than average, and attempts were made to limit the feeds of all who exceeded it, whereas at others a "good start" was condoned or encouraged. Hence overfeeding in most cases is found to be a matter of opinion rather than a real disorder.

Excessive Intake.—The orthodox feeding formula—2½ oz., or 50 cal., per lb. (156 g., or 110 calories per kg.) expected body weight a day—also attempts to level all infants down to a standard rate of gain regardless of the one who, because of defective absorption or wasteful metabolism, needs a larger intake. Hungry babies receiving the calculated quantity are often thought to be crying with the discomfort of an overloaded stomach rather than with the pangs of unsatisfied hunger. Mackay (1941) noted that in practice it is common to find that an underfed infant has been diagnosed as overfed, and this is particularly so in the early weeks.

Frequent stools occur in healthy young babies, in underfeeding and overfeeding, and with alimentary or parenteral infections ; the clinical differentiation of these conditions is not easy, but the effect of altering the size of the feed usually reveals the correct diagnosis. Gordon (1951) has shown that a bowel action with every feed is a normal feature of early infancy, and the average number of motions passed daily falls as the infant grows older. Many healthy breast-fed babies passed occasional green motions without apparent cause or harmful effect.

Vomiting and Posseting.—In 11 infants this had led to a diagnosis of overfeeding, but a reduction in the size of the feed had aggravated the symptoms. Variot (quoted by Cran, 1913) was one of the earliest to appreciate that underfeeding may cause vomiting, and Wood (1952) has discovered this anew. Organic causes for vomiting must not be overlooked, and the real danger lies, not in overfeeding, but in making that diagnosis when some other condition is present.

Crying and Colic.—Crying is common in the first three months of life. In most cases it is due to underfeeding, but in 10 cases attempts to overcome it by increasing the feeds failed. Persistent crying occurs on self-demand regimes, is often referred to as "three months' colic," and is usually attributed to wind. Levine and Bell (1950), however, believe that these infants have an unsatisfied sucking urge, and they find that most are pacified with the dummy. The wind theory receives support from the observation that a baby with colic cries vigorously, draws up his knees, and belches on being lifted ; but a hungry baby will behave in exactly the same way. Moreover, the dummy should increase the colic by encouraging aerophagy, yet in most cases it has the reverse effect.

Other Symptoms.—A number of other symptoms and signs were erroneously attributed to overfeeding. The miliary sebaceous cysts which Gordon (1949) found in about 40% of normal infants at this age were incriminated in four cases. In two cases a failure to gain was ascribed to overfeeding, presumably on the basis that diarrhoea resulted in defective absorption ; but Chung and Viscorová (1948) have shown that in infective diarrhoea more food by mouth leads, on balance, to increased absorption in spite of the passage of more frequent stools. It seems likely that the same principle would apply in the absence of infection.

Conclusion

It is as yet inadequately realized that a baby may be hungry even if he is gaining at, say, 12 oz. (340 g.) a week. Unsatisfied hunger may lead to marasmus and death, but

there is no evidence that true overfeeding ever does. Ignorance and fear, coupled with a misguided desire at welfare clinics to standardize the infants to a rate of gain which is below average and suboptimal, led to the diagnosis in most of my cases. On the other hand, the mothers, when allowed to behave naturally, were quick to recognize underfeeding, because they had to live with their hungry babies.

It is difficult to induce a baby to take a feed against its will, but occasionally simple overloading results in transient vomiting. The obese, pale, flabby baby, with his predisposition to respiratory infections, provides a combination of constitutional factors and an unbalanced diet. Adequate feeding leads to contentment rather than obesity, whereas underfeeding is apt to have far-reaching consequences, both physical and psychological, for the developing infant. The vehemence of the protestations of some medical men and women against the dangers of overfeeding suggests that their views are charged with emotion, perhaps derived from their own feeding experiences in infancy and childhood.

Summary

In a series of 503 healthy infants a definite diagnosis of overfeeding had been made in 71 (14%) and had been suspected in a further 59 (12%) between the ages of 2 and 8 weeks.

Of those infants whose feeds were reduced for this reason 72% were fully breast-fed at the time the diagnosis was made.

Retrospective inquiry definitely supported the original diagnosis in only six cases, five of which were being force-fed. In none were the symptoms alarming.

The commonest cause for the diagnostic errors lay in ignorance of the normal characteristics of early infancy with regard to the rate of gain, frequency of bowel action, and the reasons for crying and vomiting.

A conflict of interests exists between infant-welfare clinics and mothers. Of the overfed group 69% were first so diagnosed at the clinics, whereas 70% of the underfed babies were first so regarded by their mothers.

The literature does not contain factual evidence to support the view that true overfeeding is ever dangerous. Faulty feeding in years gone by, incorrectly referred to as overfeeding, has been responsible for the persistence of the traditional objections to allowing the baby to feed to repletion.

This investigation formed part of an M.D. thesis at Cambridge University. I am most grateful to Dr. Charles F. Harris for help and advice in the preparation of this paper.

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SELF-DEMAND FEEDING IN A MATERNITY UNIT

BY

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Self-demand feeding of infants has for some time been advocated as preferable to feeding at fixed regular intervals on the grounds that fixed intervals, being unnatural, do not give full scope to the smooth development of the normal infant/mother relationship, especially during the first few weeks of the infant's life (Simsarian and McLendon, 1942; Winnicott, 1948). More recently it has also been shown to be accompanied by more satisfactory breast-feeding and a more rapid gain in weight of the infant than occurs on a fixed feeding schedule (Illingworth *et al.*, 1952). In a trial carried out in 1949 in a large maternity hospital certain other points of importance emerged. We feel that they are complementary to recent papers and therefore worth recording.

An infant who is being fed on demand may require as many as ten or even twelve feeds in a period of twenty-four hours during the first ten days of life. Such frequent feeding, which is usually also at irregular intervals, may not give rise to insuperable difficulties at home, where only one infant has to be considered, but might be expected to interfere not a little with the established routine and care of mothers and babies in large maternity units, especially with routine ward procedures such as meals, swabbings and dressings, bed-pans, supervision of breast hygiene and feeds, and changing of babies' napkins, all of which are usually arranged at fixed times.

Experiment

An experiment was conducted in the Mill Road Maternity Hospital, Liverpool, of 115 beds, the main aim of which was to assess the practicability of self-demand feeding in such a unit. Secondary aims were to observe, if possible, any psychological influence of the method on the mothers and any effect it might have on the establishment and maintenance of breast-feeding and the rate of gain in weight of the infants. Self-demand feeding was instituted in two 22-bed wards in the unit and was practised for a period of four months. In one ward the paediatric registrar carefully supervised both the staff and the mothers. He personally instructed each mother in what was expected of her. In the other ward only the sister and staff were instructed, and it was left to them to put the scheme into effect.

The regime was as follows. The baby was placed in his cot at the foot of his mother's bed some three to four hours after birth, and it was explained to the mother that it was her responsibility to listen for his cry and to pick him up and feed him when she thought that he was hungry. It was further explained to her that she need not worry about the baby forming irregular habits—he would settle down into a regular rhythm quite soon. She was also told that she was at liberty to cuddle and play with him for a time after feeding and at other times if she so desired. In order that we might know how often the babies were being fed the mothers

were asked to make a note of the time of each feed. They were also instructed to hang a red disk on the cotside whenever they picked their babies up, and to put it inside the cot when the baby was put down again, in order that the nursing staff might know, especially at night, when a baby was not in his cot, and therefore possibly liable to overlaying.

The degree to which we actually achieved self-demand feeding depended, of course, on several factors: the enthusiasm and intelligent co-operation of the nursing staff; the time which the paediatric registrar was able to devote to interviewing each mother and explaining what was required of her; and the intelligence and willingness of the mothers to co-operate with us. All of these varied from time to time and, in the case of the nursing staff, from ward to ward. Of special importance was the time available to the paediatric registrar to keep in close contact with the mothers and supervise the whole procedure, for at times his other duties did not permit of such adequate supervision. Self-demand feeding did, however, operate fully in a large proportion of cases. A total of 124 babies were fed by this method.

Practicability of Scheme

The self-demand schedule was found to be practicable in that it did not seriously disturb the routine care of the mother. Any lack of supervision of breast hygiene which may have occurred did not, at any rate, result in an increased number of cracked nipples. Engorgement of the breasts appeared, if anything, to be less frequent than on a fixed feeding schedule. The supervision of feeding was unavoidably inconstant, but this was felt to be a good thing from the mother's point of view, for it enabled her to gain self-confidence. The babies were weighed daily. It was not our practice at any time to allow mothers to know of minor fluctuations in weight, but it is of course especially necessary that all concerned should appreciate that with self-demand feeding there will be fluctuations in the rate of weight gain owing to the variable times of feeding and the varying quantity of milk taken at each feed. From the point of view of the breast-milk bank it was a disadvantage, as there was no fixed time for expressing milk, and mothers did not willingly give up milk when they did not know how soon baby might require another feed. Changing of the babies' napkins was, at any rate, frequent enough to prevent the development of sore buttocks.

With regard to the amount of work falling upon the nursing staff, the nurses were of the opinion that in general they were less overworked than with a fixed feeding schedule, but that at night greater vigilance was required because of the possible risk of overlaying. The light which the sister considered to be necessary at night to reduce this risk was disliked by the mothers.

Psychological Aspect

The most important psychological benefits which may result from self-demand feeding are a better parent/child relationship, an increased sense of security for the child, and fewer behaviour problems—all long-term effects which could not be observed in this series.

The immediate effects, however, were noteworthy. There was no doubt that many of the mothers appreciated the self-demand regime. Some multiparae, who had nursed a previous baby at fixed times and were able to compare the two methods, preferred self-demand. They stated that they felt that the baby was, in fact, theirs and not a baby loaned to them by the sister every three hours for feeding purposes. They appreciated the greater sense of responsibility, the feeling that their baby really needed them, and the freedom to use their own initiative in meeting his needs.

Breast-feeding

The 124 mothers (37 primiparae and 87 multiparae) and infants on self-demand feeding while in hospital were followed up for 10 months. A total of 110 mothers (44 primiparae and 66 multiparae) and infants on a fixed feeding schedule in hospital were selected as controls, but on following them up after several months it was found that 34% of these had adopted self-demand feeding at home on their own initiative and for their own convenience. The follow-up "control" group therefore included a considerable element of self-demand.

It is sufficient to record that in the self-demand group 30% of the cases were breast-fed for 5 months or over and the average length of time of breast-feeding was 3.17 months; while in the control group, including those who changed to self-demand at home, 28% of cases were breast-fed for 5 months or over and the average length of time of breast feeding was 3.85 months. In general, self-demand feeding involved frequent feeds at irregular intervals only during the first fortnight. Thereafter feeds were "demanded" at fairly regular intervals. As already mentioned, the frequency of sore nipples and engorged breasts was not increased by demand feeding. The infants on self-demand appeared, on the whole, to take the breast better than a fixed feeding schedule.

Comparison of the weight charts of infants on self-demand and on a fixed regime while in hospital was made only in a limited number of cases. In 15 cases on self-demand the average fall in weight after birth was 7 oz. (200 g.), in 15 controls 8 oz. (227 g.). In a period of hot weather, on the other hand, the average fall in the self-demand group was 7.7 oz. (220 g.), in the controls 7 oz. (200 g.). Of 15 cases on self-demand 9 were above their birth weight on discharge from hospital, and of 15 controls 5 were above their birth weight.

Discussion

Illingworth *et al.* (1952) refer to self-demand feeding in the Jessop Hospital for Women, Sheffield, but make no reference to the possible difficulties of such a regime and how they were overcome. Other large maternity hospitals which have not yet introduced this method may be thinking of doing so, and for this reason it was thought that a description of our experience of the above experiment might be of interest. Certain points require to be stressed.

The aim of self-demand feeding is not primarily to eliminate difficulties which arise in the maternity hospital. With the usual ward discipline and routine, which includes a fixed feeding schedule, there are few such difficulties with mother or infant in the ward; troubles usually begin when the mother finds herself responsible for her child for the first time when she is back in her own home. Here she is probably offered advice by mother, mother-in-law, and neighbours, each of whom may advise her differently, with the result that she becomes confused and probably discouraged. With self-demand feeding, on the other hand, the mother's troubles are largely met in hospital, where help and reassurance are readily forthcoming and advice is likely to be easily understood and followed by the mother.

The successful introduction of self-demand feeding depends primarily upon a thorough understanding of its purpose and method of working by the nursing staff and mothers. This involves individual instruction of each mother within 24 hours of delivery, as it is the first few days that count most. It also entails detailed individual instruction of each nurse at the beginning of her tour of duty in the maternity ward. In our experience, inadequately instructed nurses were inclined to impose their own ideas of feeding on the mother rather than to supervise a true self-demand schedule. The keynote of the scheme should be that mother and child manage it together, with a minimum of interference by nurses and doctors, help being confined to a little practical assistance and reassurance, usually only when asked for or when medically indicated.

Supervision of self-demand feeding, however, especially during the early months of its introduction in a unit, must be constant and detailed. The paediatric registrar is well situated to supervise the whole procedure, but it is essential

that he should have adequate time to keep in close contact with all the mothers and perhaps to assist the sister in the instruction of nurses. It is noteworthy that Illingworth *et al.* found the services of two registrars to be necessary at the Jessop Hospital for Women, Sheffield.

Where supervision is not adequate self-demand is likely to degenerate into regular feeding, with "a little drop in between if he cries." This happened in our ward not supervised by the registrar.

We wish to thank Professor T. N. A. Jeffcoate and Mr. C. H. Walsh for permitting us to make a trial of this method of feeding in their wards, and also to express our appreciation of the willing co-operation of the nursing staff.

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ACUTE LABYRINTHITIS

BY

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In the *Lancet* of February 9, 1952 (p. 299), it was suggested that there was prevalent at the time an unusual epidemic characterized by the sudden onset of vertigo and nystagmus. Nystagmus is described as "a rapid oscillatory movement of the eyes, independent of the normal movements, which are not affected" (Law, 1945). Vertigo, the causes of which are many, depends upon "a disturbance of the sense of equilibrium" (Farquar Buzzard, 1945), and can be divided into general vertigo and special vertigo. In the latter, objects appear to move, or the patient may himself tend to fall in a definite direction. Nystagmus has been classified (Russell Brain, 1947) into several distinct groups: (1) defective or abnormal retinal impulses; (2) abnormal labyrinthine impulses; (3) lesions of the cervical spinal cord; (4) lesions involving the central paths concerned in ocular posture; (5) weakness of the ocular muscles; (6) congenital abnormality of unknown aetiology; and (7) hysterical. In the present series the nystagmus fell into group 2, and was labyrinthine in origin.

Labyrinthitis has been described in two forms (Tidy, 1945): (1) Ménière's disease, and (2) Ménière's symptom-complex, in which there occur tinnitus, attacks of vertigo, nausea, and progressive deafness. Ménière's disease has three main classes of symptoms (Purves-Stewart, 1945): first, violent giddiness and reeling caused by involvement of the semicircular canals and vestibular mechanism; then with involvement of the cochlear auditory apparatus, tinnitus, and nerve deafness, incomplete at first but fluctuating in intensity; and, thirdly, cold, clammy sweat, and nausea and vomiting of bulbar phenomenon, due to affection of the adjacent medullary centres. Finally, Ménière's disease usually occurs in later years, and is relatively uncommon.

The six cases recorded below have all been seen in routine practice within the last year. They are my own patients, visited in the usual manner. They all reside within a radius of one mile from my surgery.

Case 1

A man aged 58 was first seen at my surgery on the evening of April 12, 1951, with a history of severe vertigo of sudden onset from early afternoon. In standing and walking he was assisted by his wife, and was literally falling around the room. His oral temperature was normal, and his pulse, although fast, was regular and of good volume. No pathological condition was found in the ears, and examination of the heart and lungs provided no clue to his condition. His blood pressure was 180/90 mm. Hg. There was gross rotating nystagmus, but no other abnormality was found in the central nervous system. He was seen at his home on April 13, when there was little change in his general condition. Nystagmus was produced by opening the eyes and attempting to focus on an object, or on very slight movement of the head. When the nystagmus was present the patient had intense vertigo, which produced vomiting, sweating, and a cold clammy skin. On the 14th he had improved, and on the 16th could sit up in bed without vertigo. On the 19th he was able to attend the surgery, but complained of "lightness of head," so that he did not feel well enough to return to work until April 30.

On May 7 he was examined by an otorhinologist, who reported: "This case suggests an acute labyrinth irritation, which has not recurred since. The right Eustachian tube is completely blocked." On June 4 an audiometric test showed slight impairment of both auditory nerves. Some 11 months later the patient was well and symptom-free.

Case 2

A married woman aged 73 suffering from pernicious anaemia had been receiving regular liver therapy, and her last blood report showed 5,000,000 red cells and 98% Hb. I first saw her on November 10, 1951, when she was in bed in a shocked state, suffering from intense vertigo and sickness. It appeared that she arose as usual at 6.30 a.m., fed her fowls, and had breakfast. At about 8.30 a.m. she was bending over her sink preparing the lunch, when suddenly she was overcome with intense vertigo, vomiting following shortly afterwards. She was carried to her room, and was lying in bed, fully clothed, terrified to move or to open her eyes. Rotatory nystagmus was gross, and she was violently sick and dizzy when attempting to sit up or to move her head. There was no pyrexia, and, apart from the nystagmus, there were no abnormal findings in the central nervous system. I visited her daily for some days, during which her recovery was progressive, and on November 16 she was able to walk down the stairs unaided. I have seen her several times since then, and she has remained perfectly well.

Case 3

This patient was a man aged 61. I visited him at his home on December 17, 1951, and his syndrome was similar to that of Cases 1 and 2. He was finally seen at his home on December 24, when he was able to move about the house. He did not return to work until January 14, 1952, because of feeling "light-headed" on sudden movement. His daughter was, at the same time, confined to bed with a severe tonsillitis. Unfortunately I did not have a throat swab taken, but the case responded to penicillin injections, and the pathological state suggested infection by the haemolytic streptococcus.

Case 4

A man aged 56 went to work on January 10, 1952, feeling fit. He was writing on the blackboard, when suddenly he found that it had begun to dance before his eyes. He got into his car and drove four miles to his home. When I visited him shortly after his return he had slight rotatory nystagmus on moving his head. The next day the vertigo and the nystagmus had gone and he felt quite fit. He returned to work on January 14, and has had no recurrence of his complaint.

Case 5

A married woman aged 30 awoke on the morning of January 15, 1952, feeling perfectly well. On attempting to get out of bed she had intense vertigo. When seen by a trained nurse about two hours later the vertigo had not decreased and there was extreme nausea. She was reported

to have "fallen back in a faint" each time she attempted to sit up, but she was not completely unconscious, since she was capable of understanding what was said to her. She was cold and shocked and pallid when the vertigo occurred. The next day she was able to sit up in bed without vertigo, and no nystagmus was present. She was "light-headed" for about two weeks after this attack, and sudden movement produced mild vertigo.

Case 6

This case is of special interest in that the patient was a next-door neighbour of Case 4. It is of interest, too, because the onset of his symptoms was just over 48 hours after that of his neighbour. A history of contact is available: on the morning of January 10, 1952, the patient sent for medical aid for Case 4. He then went into his neighbour's house to inform him that the doctor would soon arrive, and spent about five minutes in conversation.

The patient, a man aged 49, went to the cinema with his wife in the afternoon of January 12. To use his own words, he "felt as fit as a fiddle." After about half an hour he suddenly found that the screen was "beginning to wobble." He decided that this was due to the fact that he was sitting nearer to the screen than was his custom. The feeling passed off in a few minutes, only to recur. That too passed off, and he remained for another two hours, until the programme had finished. When he arose to leave the vertigo suddenly returned, so that it became necessary to hold on to his wife lest he should fall. Outside he felt much better and returned home by bus—a distance of about 10 miles. After entering the house the vertigo returned with great intensity, and at one stage it seemed as if the floor on his left occupied the position where the ceiling ought to have been on his right. The whole room seemed to rock and sway, but he himself did not appear to move. In a few minutes he was violently sick and the sickness lasted for about one hour, after which he managed to retire to bed and fell asleep exhausted. The next morning his "stomach was upset," but there was no further vomiting or vertigo. He returned to work on the 14th. On January 31 he stated that he had a slight feeling of falling when he was stepping forward. This lasted two or three days and then passed off. The symptoms were purely subjective, and he did not experience true vertigo.

He first came to see me on February 7 because since his illness on January 12 he had suffered from "palpitation, heartburn, and light-headedness," and seemed to have indigestion and flatulence after meals. Clinical examination showed his heart to be sound, and his blood pressure to be 150/94 mm. Hg. He had had a partial thyroidectomy in 1922 for parenchymatous goitre, otherwise his previous history was of no special interest.

On March 6 he was examined by an otorhinologist, who reported: "There was no obvious cause in the way of a precedent cold, earache, or general disturbance. Both drumheads appeared normal. In both ears air conduction was better than bone conduction, and the Weber test was negative. Audiometry shows a very slight loss of hearing in the left ear as compared with the right, but the bone-conduction readings are virtually normal for this instrument. With cold caloric tests with water at 60° F. (15.6° C.) on the right, vertigo and nystagmus began after 45 seconds and cleared in 110 seconds. On the left it began at 30 seconds and ceased at 135 seconds. These figures show slightly increased irritability of the left labyrinth, but are really almost normal within the limits of the test."

Discussion

These six cases present as cases of acute labyrinthitis of uncertain aetiology. It is interesting that five of them occurred between November 10, 1951, and January 15, 1952. Another case in the same district was seen by a colleague of mine in January, 1952. In all cases the onset was extremely sudden, the patient feeling perfectly well one minute and having vertigo a moment later. There was no previous malaise or pyrexia, I was unable to find any aural pathology, and there was no complaint of deafness. The average age of the patients was 54 years, and they all had been, and continue to be, in reasonable health. No treatment was required except rest in a dark room and small doses of phenobarbitone.

There is a great risk in trying to draw a conclusion from a small number of cases followed up for such a short time. I believe, however, that this may prove to be another manifestation of virus disease, the view being suggested by the history of contact between two next-door neighbours who developed similar symptoms within three days. I have not been able to establish any means of contact between the other cases. I suggest, however, that, like anterior poliomyelitis, the disease may be spread by carriers, that subclinical attacks occur, and that mild forms of the disease may pass unrecognized.

Summary

Six cases of acute labyrinthitis seen in general practice within one year are recorded; it is suggested that the disease is spread by a virus.

I wish to thank Mr. A. D. Bateman for his report on Case 6.

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A CASE OF PHLEGMASIA CERULEA DOLENS

BY

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The so-called "blue phlebitis," or phlegmasia cerulea dolens, was first described by Trémolières and Véran (1929), and De Bakey and Ochsner (1949) state that since then a further 32 cases have been recorded, mostly in the French literature. Because of the importance of early recognition and treatment of those cases associated with peripheral circulatory collapse, and because it is possibly not widely known that many cases are in fact associated with peripheral circulatory collapse, the following case is put on record.

Case History

A woman aged 67 was admitted to hospital on the evening of December 13, 1951. She had felt quite well until early that morning, when her left leg became swollen; it progressively increased in size, and ached a little in the calves and later in the posterior aspect of the thigh. She remained in bed for most of the day, and at about 4 p.m., some eight hours after the onset, she suddenly collapsed with severe pain in the left groin and hypogastric region associated with vomiting. The pain was intermittent and colicky in type, and she vomited four times. The bowels had been regular until the day previously, but had not been opened for 24 hours. There was slight frequency of micturition, and the patient thought she had been losing weight recently. The past history revealed nothing significant.

On examination the patient was seen to be well-nourished. She was in severe pain and was obviously shocked. Her face was pale and there were beads of cold sweat on her forehead. The pulse was 116 and of poor volume; blood

pressure 95/65. Her left leg was very swollen and of a deep violaceous colour. The colour was most pronounced below the knee, and gradually faded as it progressed up the thigh to merge with normal-coloured skin over the lower abdomen. There was great tenderness over the line of the ilio-femoral vein, extending well up into the L.I.F. The temperature of the leg was quite normal and the femoral and dorsalis pedis pulses were easily felt; the posterior tibial and popliteal pulses were, however, not felt. Abdominal examination revealed active peristalsis, no distension, and deep tenderness and slight guarding in the L.I.F. Rectal and vaginal examination revealed no abnormality. Examination of the respiratory, central nervous, and cardiovascular systems revealed no abnormality except the evidence of peripheral circulatory failure already mentioned.

A diagnosis of deep femoral thrombosis was made, but at that time the reason for the peripheral circulatory failure was not appreciated, and the possibility of a silent—that is, painless—coronary thrombosis with secondary femoral vein thrombosis due to the fall in the blood pressure was considered.

Heparin, 8,000 units six-hourly, was given intravenously for 48 hours, controlled by 12-hourly estimations of the coagulation time, together with ethyl biscoumacetate ("tromexan"), four tablets in the first 24 hours, three tablets in the second 24 hours, and thereafter as indicated by the prothrombin index. Owing to the persistence of the signs of shock it was decided to give dextran intravenously. Although the possibility of a silent coronary thrombosis could not be excluded, it was thought that cautious intravenous therapy, keeping a careful watch for signs of basal congestion and venous distension, was unlikely to do her much harm and might do a lot of good. After 2 pints (1.1 litres) of dextran, given over a period of 12 hours, the patient's condition was much improved—her blood pressure had risen to 125/75, and the pulse had slowed to 80 and was of much better volume. The pain in the leg and abdomen subsided during the first 12 hours of anticoagulant therapy, and vomiting did not recur. The leg remained blue for approximately eight days, after which the colour gradually returned to normal. The swelling, however, took much longer to subside and was still partially present on the patient's discharge from hospital.

During her period of convalescence the red blood cells numbered 5,200,000, 4,900,000, and 4,850,000; the electrocardiogram showed no evidence of cardiac disease; and a barium enema showed the presence of multiple diverticula in the descending and sigmoid colon but no evidence of diverticulitis or of malignant disease of the colon. Sigmoidoscopy revealed nothing abnormal to just above the rectosigmoid junction.

The leg swelling had subsided sufficiently for the patient to be got up on January 4, 1952, but a crêpe bandage from the metatarsal heads to the groin was applied for support. Anticoagulant therapy was discontinued on January 8, and she was discharged home on January 13.

When she was seen again in the out-patient department on January 28 the leg was still moderately swollen, but she was quite well, and the leg became painful only after she had been up on it for several hours. A full-length elastic stocking had been supplied, and she was advised to rest in a recumbent position fairly frequently with the leg raised above the heart level.

The unusual blue colour of the swollen leg, so noticeable during the acute stage of the illness, led me to consult the literature on blue phlebitis, and it was only after this that the full significance of the patient's initial collapse and peripheral circulatory failure was fully appreciated.

Discussion

Blue phlebitis is undoubtedly much rarer than the well-known "white leg," or phlegmasia alba dolens. When the blue variety does occur, however, its onset may be sudden and dramatic, and if inadequately treated may lead to death. The gravity of this form of venous thrombosis is shown by the fact that death occurred in 8 out of the 32 cases recorded, and in most of these death ensued shortly after the onset of the condition, the patient never recovering from the state of peripheral circulatory collapse.

It is interesting that in the above case the possibility of a cardiac lesion was seriously considered and almost led to the withholding of intravenous therapy, which is of such great importance in the treatment of the initial collapse and without which the patient may quite possibly have failed to recover.

Most of the reported cases conform to a fairly constant pattern, and the general march of events is usually as follows. The patient's first complaint is most often of pain, which comes on suddenly in the calf, thigh, or groin and eventually involves the whole limb. The pain is severe and sometimes agonizing, and is soon followed by signs of peripheral circulatory collapse. At the same time the leg becomes swollen and the colour changes develop. These are almost as dramatic as the other symptoms, the whole leg becoming suffused with a deep violaceous colour which is in marked contrast to the blanched appearance of the white variety of this thrombotic venous lesion. The time taken for the full development of this clinical picture varies, but is seldom longer than 30–45 minutes. Most cases have occurred in adults, and the sexes are affected about equally. The skin temperature on the affected side is likely to be lower than on the sound side, and the peripheral arterial pulses often become impalpable owing to the collapse. In some instances this has led to the unnecessary exploration of the main artery of the limb on the misdiagnosis of arterial embolism or occlusion (De Bakey and Ochsner, 1949). In some cases, however, including the one reported above, the peripheral arterial pulses remain palpable throughout. In those cases which survive the period of collapse the pain gradually subsides, the deep-blue colour gradually fades, and progress is not unlike that of phlegmasia alba dolens; there is, of course, the same likelihood of valvular destruction, leading to deep femoral incompetence and indurated leg.

Another type of acute venous thrombosis actually progresses to gangrene. This has been well described by Audier and Haimovici (1938) and Fontaine and Forster (1946). Haimovici and Suffness (1948) have published a report of a case which seems to connect the three different manifestations of deep thrombosis in the lower limbs. The case first showed the clinical picture typical of phlegmasia alba dolens; the leg then became cold and cyanotic, taking on the picture of phlegmasia cerulea dolens; and finally the toes and two areas on the plantar surface of the foot became gangrenous.

It seems probable, therefore, that deep thrombosis in the leg may lead to three different and well-marked clinical pictures—namely, phlegmasia alba dolens, phlegmasia cerulea dolens, and venous gangrene. Between these well-marked clinical types there will, of course, be intermediate grades showing a mixture of two or all three of the types. The extent and the rapidity of the thrombosis in conjunction with the state of the arterial system will determine the clinical picture in each individual case.

The type of case under discussion here does not as a rule proceed to gangrene but is particularly associated with sudden onset, deep violaceous discoloration, and the signs of peripheral circulatory failure.

Pathogenesis

Magendie and Tingaud (1945) remarked that the severity of the manifestations in this type of thrombosis suggests that coagulation occurs suddenly "with the brutality of a physico-chemical reaction." The initiating cause of this brutal reaction, however, remains obscure. That the arterial system is not also involved has been satisfactorily demonstrated by careful arteriograms, dissection of amputated extremities, necropsies, etc.

On the evidence available it seems that neither arterial nor venous spasm is responsible (Haimovici and Suffness, 1948; De Bakey and Ochsner, 1949). In most of the reported cases factors well known to predispose to venous thrombosis, such as polycythaemia vera, dehydration, cardiac failure, and prolonged recumbency, have been absent.

It is well known that phlegmasia alba dolens occurs commonly during the puerperium, and this also applies to the severe variety of thrombosis which leads to gangrene. Cases of phlegmasia cerulea dolens, however, do not seem to be specially associated with the puerperium, and none of the reported cases have occurred during that period.

Treatment

This can conveniently be considered from the aspect of the peripheral circulatory failure, of the thrombosis, and of the swollen limb. As regards the peripheral circulatory failure, it is important to recognize that this demands urgent treatment with intravenous fluids which remain within the cardiovascular system. Compatible blood, small pool plasma, or dextran may be used, the amount necessary depending on the degree of the collapse. Treatment of the thrombosis demands the usual combination of heparin and ethyl biscoumacetate, and anticoagulant therapy should be continued until the patient is ambulant. As neither venous nor arterial spasm seems to play an important part, sympathetic blocks, papaverine injections, etc., can reasonably be omitted.

Treatment of the swollen limb entails its elevation above the heart level until the swelling has subsided, followed by external support to the limb in the form of an elastic stocking or of crêpe bandages when the patient becomes ambulant. Persistent swelling of the limb despite these measures is no different from that following phlegmasia alba dolens, and the treatment of this is beyond the scope of this paper.

Summary

A case of phlegmasia cerulea dolens is described. Points of interest from the literature are discussed. Active treatment of the phase of collapse and peripheral circulatory failure is advocated. At the same time full doses of anticoagulants should be given. The further course is not dissimilar from that of the better-known phlegmasia alba dolens.

I wish to thank Mr. M. Silverstone for permission to publish this case and for his helpful criticism.

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One of the difficulties confronting medical officers of health is alluded to by Dr. W. R. Perry, M.O.H. of Basford R.D.C., in his *Annual Report* for 1951. He refers to the elderly person who lives alone and, though not bedfast, is infirm and mainly dependent upon others. This type of person is often unwilling to leave home, but relatives and other interested people may bring considerable pressure to bear on the M.O.H. in an attempt to have their aged relative removed from home. Dr. Perry points out that compulsory removal from home can be undertaken only in certain restricted circumstances. Except under the Lunacy Acts, the person must be infirm or suffering from chronic illness, be living in insanitary conditions, be unable to devote to himself the necessary care and attention, and not be receiving such care from other persons. He also points out that, quite apart from the reluctance of most elderly people to leave home, it would be economically impossible for the nation to care for the majority of its aged persons in hospitals and institutions.

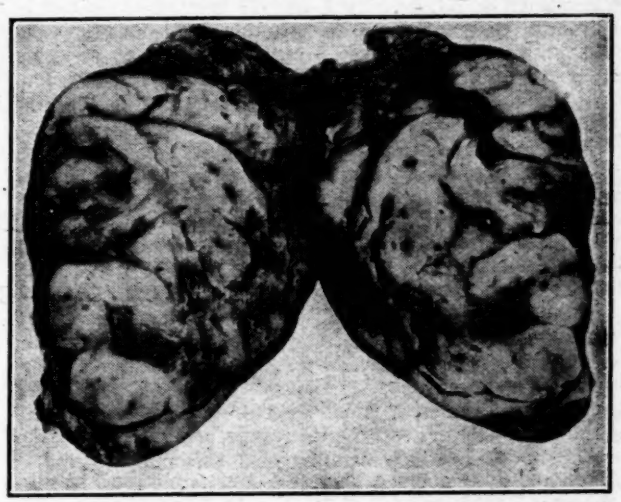
Medical Memoranda

A Case of Palpable Parathyroid Tumour

The following is a case in which adenoma of the parathyroid gland presented with simultaneous fractures of the necks of both femora.

Case Report

A man aged 26 gave the following history. Four months before admission he complained of a painful swelling of the right knee following a minor degree of trauma. The effusion gradually subsided. Three months before admission he complained of increasing anorexia, nausea, and occasional vomiting; loss of weight, lassitude, constipation, and polyuria also occurred. During the two weeks before admission he complained of severe cramp-like pains in the muscles of the legs and trunk, but rarely affecting the arms. Suddenly while walking he collapsed with severe pain in both hips and was admitted to hospital.



Examination showed him to be a pale, wasted, ill-looking young man, obviously in great pain. Both hips were kept in the position of flexion. There was a well-defined swelling about 1 in. (2.5 cm.) in diameter in the neck just to the left of the midline and below the level of the cricoid cartilage. This swelling felt very much like a thyroid adenoma on palpation. His blood pressure was 115/80.

X-ray examination showed fractures of the necks of both femora. The general trabeculation of the upper ends of the femora was obviously coarse and abnormal, and there was marked thinning of the cortex. Further radiographs of other bones, especially the humerus and the small bones of the hand, showed similar evidence of decalcification. The characteristic cystic appearance of hyperparathyroidism was poorly shown. No renal calculi were seen in a straight radiograph of the abdomen.

Biochemical investigations yielded the following relevant results: serum calcium, 18.8 mg. per 100 ml.; serum phosphorus, 3.4 mg. per 100 ml.; blood urea, 74 mg. per 100 ml.; serum alkaline phosphatase, 43.5 K.A. units per 100 ml.; serum albumin, 3.8 g.%; serum globulin, 3.4 g.%; haemoglobin, 74%. The urine contained a trace of albumin, but no Bence Jones proteose was detected.

The fractures were treated by extension. In view of the clinical, radiological, and biochemical findings it was decided to make a surgical exploration of the neck. As the general condition of the patient was poor and the pain was severe and difficult to control, the operation was performed as soon as the above investigations were completed.

Operation.—On January 3, 1951, exploration of the neck was performed (W. D. P.) under general anaesthesia. Through a collar incision the palpable tumour was easily

exposed. The tumour, which lay in the same plane as the thyroid, was pear-shaped and approximately 5 by 3 by 1.5 cm. in size. It was at first thought to be a thyroid adenoma, and in fact it was felt that it might be the only thyroid tissue present, as the gland itself was not immediately obvious. This was due to the small size of the thyroid, which, however, on careful exploration was quite normal. The tumour lay immediately below the left lobe of the thyroid. Further exploration revealed no other tumour, and no obvious parathyroid tissue was seen. It was therefore decided that the tumour was probably the offending parathyroid, and removal was carried out.

Post-operative Course.—Immediately after operation 10 units of parathormone was given intramuscularly, being repeated every 12 hours. Vitamin D_2, 100,000 units, and calcium lactate, 3 g., were also given, and were continued daily. In view of the difficulties of moving the patient about the bed penicillin was given to reduce the risk of post-operative pneumonia. During the first 24 hours the serum calcium fell to 13.6 mg. per 100 ml., and then gradually to 7.9 during the following 12 days.

Two days after the operation the patient developed acute suppression of urine, only 2 oz. (57 ml.) being passed in 24 hours, the blood urea at this time being 284 mg. per 100 ml. At the end of the fourth day the blood urea had risen to 400 mg. The urinary output then increased gradually and the blood urea began to fall, eventually reaching normal four weeks after the operation. After 21 days the urine became free from albumin. Four days after the operation, following several hours of increasing irritability, the patient developed frank tetany. Calcium gluconate, 20 ml., was given intravenously, this relieving the spasms in about half an hour. The dose of parathyroid hormone was then increased to 20 units twice daily. Tetany occurred on five subsequent occasions during the next three days, and each time was controlled by intravenous calcium gluconate.

One week after the operation the patient had become much more comfortable and was free from pain. He was given a high carbohydrate diet, with iron and vitamin C added, and made an uninterrupted recovery. The most prominent features of the convalescence were the rapid relief of pain after operation and the improvement in physique, the patient gaining over 3 stone (19 kg.) in three months. Radiographs of bones taken 10 months later showed complete restoration of the normal pattern.

Morbid Anatomy.—The tumour was a well-encapsulated oval mass 5 by 3 by 1.5 cm., weighing 17.6 g. The histological appearances were those of a simple adenoma of the parathyroid.

Comment

The following features of this case appear to be of interest. In the first place a parathyroid tumour is rarely palpable before operation, and as a result of this it was at first thought that the tumour was thyroid tissue. It is obvious that the common reasons for this are that the adenomata are rarely as large as this and that they normally lie in situations where they are well covered by the surrounding tissues. In this case, however, it was placed more superficially than one would expect to find either normal or abnormal parathyroid tissue. Crotti (1938) states that he has noted only one case palpable before operation; and Lievre (1932), after reviewing all the literature, could find only seven cases in which the tumour was felt.

The occurrence of acute suppression of urine and uraemia following removal of a parathyroid adenoma has been noted before. Usually, however, there is radiological evidence of calcium deposition in the renal tract, a feature which was absent in this case. The pathological process is apparently a reversible one, as the urine eventually became normal and the renal-function tests performed later were well within normal limits. The rapid rise in blood urea and the subsequent fall suggested that the renal lesion was probably a lower nephron nephrosis. There was no significant change in the blood pressure.

Severe muscular pains were a very prominent symptom, and it is interesting to note that these cleared up extremely rapidly after operation. In fact, the presence of these severe pains, which were very difficult to control by any drug, was the main reason for expediting the operation.

Finally, it was noted that the control of tetany was best accomplished by the slow administration of calcium gluconate intravenously. Parathormone was given in small doses repeated fairly often, but, even so, its efficacy seemed to diminish rapidly after the first two or three injections.

We would like to thank Dr. L. Phillips for the histological report, Dr. W. S. M. Grieve for the biochemical estimations, and Mr. R. A. King, the orthopaedic surgeon to the hospital, into whose ward the patient was admitted.

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Terramycin in Pertussis

Haemophilus pertussis is sensitive *in vitro* to terramycin (Hobby *et al.*, 1950), its sensitivity being approximately of the same extent as to chloramphenicol (Wells *et al.*, 1950). It has been shown that pertussis can be modified by chloramphenicol given early in the pre-paroxysmal stage (Bogdan, 1951a, 1951b), and it was decided to investigate the effect of terramycin along the same lines. This paper reports the results obtained in a small preliminary series of swab-positive cases treated with terramycin in both the pre-paroxysmal and the paroxysmal stages of the disease.

This trial was carried out on out-patients attending the Pertussis Contact Clinic of the Westminster Children's Hospital. No special selection of cases was made apart from the exclusion of all those who had at any time been immunized against pertussis or whose cough had been paroxysmal for more than two weeks and were too advanced in their illness for assessment of treatment. The cases were divided into three groups for assessment of results. In the course of this trial, which extended over ten months, a few further cases were excluded from all three groups through failure to attend for follow-up or complete treatment.

Crystalline terramycin hydrochloride was given in an elixir or as oral drops to the younger children, and in 250-mg. capsules to the older children. The daily dosage was the same in all cases—30 mg. per lb. (66 mg. per kg.) body weight, usually divided into four doses and given for five or seven days. The seven-day course was used at the start of this trial, but a five-day course was later found to be adequate. Symptomatic treatment consisted of nasal drops of ephedrine hydrochloride (½%) in normal saline, and a simple non-opiate linctus, and was given to the children in all three groups.

Results

All the cases treated with terramycin were swab-negative at the completion of their course of treatment. Evaluation of treatment was based on cough. The paroxysmal stage covered the period of spasmodic cough, regardless of the presence or absence of whooping. The length of illness was assessed by the total duration of cough, however slight or intermittent.

Group I consisted of 10 children who were given treatment in the pre-paroxysmal stage. Seven of these, who were started on terramycin by the fifth day of symptoms, did not develop a paroxysmal stage, their total duration of cough ranging from 4 to 16 days. The three remaining cases, in which terramycin was started after the fifth day of the pre-paroxysmal stage, developed a paroxysmal stage lasting 2, 21, and 27 days. Their total duration of cough was 11, 35, and 36 days respectively. Two of the children, whose illness had been arrested, started to cough and became swab-positive again after re-exposure to infection. They had been symptom-free for three weeks with negative swab-cultures in the interval. A further course of terramycin once more successfully arrested their illness and there was no further recurrence. A third child whose illness had also

been arrested by terramycin became reinfected after a week's interval, and was not seen again until he had begun to whoop. These cases show that pertussis arrested by treatment may not be followed by immunity.

Group II consisted of 14 children treated early in the paroxysmal stage. Paroxysms continued for periods ranging from 6 to 33 days. Their total duration of cough ranged from 12 to 46 days. In one case segmental pulmonary collapse was noted after treatment.

Group III consisted of 11 cases of pertussis given no antibiotic. Four failed to develop a paroxysmal stage and their total duration of cough ranged from 21 to 40 days. In the seven paroxysmal cases paroxysms occurred for periods ranging from 4 to 31 days, and the total duration of cough ranged from 30 to 49 days.

Comment

These results suggest that terramycin given early in the pre-paroxysmal stage can, like chloramphenicol, modify and arrest the course of pertussis. The onset of paroxysms may be averted and the duration of the illness and infectivity is shortened. Immunity may not follow arrest of the illness in the pre-paroxysmal stage, and for ultimate protection immunization may still be advisable. These results are comparable to those previously obtained with chloramphenicol in pertussis contacts, and suggests that terramycin may be used as an alternative if its value is confirmed by more extensive trials.

I am indebted to Dr. Gladys Hobby, of Pfizer's (N.Y.), for a gift of terramycin, to the Department of Bacteriology at the Westminster Medical School for bacteriological investigations, and to the medical and research committees of the hospital for encouragement. This work was completed with the aid of the Mary Scharlieb Research Studentship of the University of London.

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Epithelioma of the Male Urethra following Injury

Primary carcinoma of the male urethra is very rare (Loughnane, 1948), rare (Bieberbach and Peters, 1929; Lower, 1931; Thomson-Walker, 1948; Willis, 1948; Riches and Cullen, 1951), or, at any rate, uncommon (Lower and Hausfeld, 1947; Nanson, 1951). Elton (1952) estimated the total cases in the literature at 198, but did not include the 15 cases of Riches and Cullen or Nanson's two. Nanson's own estimate of 189 cases also does not include those of Riches and Cullen. The total is now therefore about 215.

Despite this comparatively small total, opinion regarding the relationship between the neoplasm and trauma is far from unanimous. Thus, while Loughnane says that trauma, "an antecedent of carcinoma in other parts of the body" (unspecified), is not apparently significant in the case of the urethra, and, further, is against any relationship between the very common stricture and the rare urethral carcinoma, Goldstein and Abeshouse (1937) thought that many regarded trauma as next in importance to gonorrhoeal stricture as predisposing to neoplasm, and quoted Rizzi as finding a history of trauma in 10% of cases, and others as reporting cases antedated by perineal injury.

Nanson thought that all were agreed that post-gonorrhoeal stricture was a potent causal factor, and quotes various writers as finding stricture (either post-gonorrhoeal or traumatic) before half to three-quarters of cases. Colby (1950), however, does not mention carcinoma following injury, and doubts whether chronic irritation or urethral stricture plays a significant part in its development.

The following three cases in the literature, in which injury possibly played a part, show wide differences in the history.

Bieberbach and Peters (1929) described the case of a man of 42 in whom they found complete retention and a hard inflamed perineal swelling (without fistula) three months after a probable perineal injury. The swelling proved to be an epithelioma, and the man died five months later. In Lower's case (1931), although squamous carcinoma was found several years after a perineal injury (years in which rectal fistula, perineal incision for acute retention, and perineal fistula were incidents), he was able to remove 1½ in. (3.8 cm.) of urethra, rejoin end to end, and report the patient in good physical condition nine years later and requiring dilatation only twice a year. Although Maximow and Bloom (1948) say that patches of stratified squamous epithelium are common in the lining of the cavernous part of the urethra, Nanson postulates squamous metaplasia and possible leucoplakia behind the stricture as the origin of the malignant change. He found keratinizing squamous epithelioma in a man of 62, whose urethral difficulties had started 40 years before in a fracture of the penis at the peno-scrotal junction during intercourse; this was followed by a urethrocele, and the cancer was found in a recurrent fistula at the site of this.

In the following case death due to cachexia from urethral carcinoma occurred eight months after an incapacitating perineal injury.

Case Report

A miner aged 54, of previous good health, fell heavily on November 7, 1950, when operating a machine at the coal-face. He hurt his back, and at the end of the shift complained of severe pain and swelling in the perineum. He did not work again from that day.

He was admitted to hospital on November 10, a peri-urethral abscess was opened, and he was discharged after 18 days in an apparently satisfactory state. He was admitted to another hospital on December 11, having been passing urine through a perineal fistula for a few days. He was catheterized and given chemotherapy, and after nine days was discharged with the note, "Satisfactory; no leakage, tenderness, or swelling."

The fistula soon reopened, and he was admitted to a third hospital on January 10, 1951, under the care of Mr. W. Irving. Attempts to excise the fistula were not successful, and on April 12 a biopsy of the sinus showed keratinizing squamous epithelioma. Spread of the neoplasm was rapid, and, the condition being inoperable, the man was discharged home on May 19, dying there on July 6, just eight months from the date of injury.

At necropsy on July 7 the body was very wasted; there were enlarged necrotic neoplastic glands in both groins; the whole perineum was widely gaping from extensive neoplasm, which had spread forwards on to the scrotum; the proximal half of the shaft of the penis was thickened and indurated, and, when an attempt was made to remove the bladder and genitals intact, it was found that neoplasm had completely eroded through the proximal part of the urethra and the surrounding tissues. Histology of portions of the shaft of the penis, external iliac glands, prostate, bladder wall, inguinal glands, and perineum showed a predominantly keratinizing squamous epithelioma.

Thanks are due to Mr. Norman Graham, H.M. Coroner, Stockton Ward, for permission to publish, and to Mr. T. J. Shields, B.M.A. Librarian, for assistance with the references.

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Reviews

THE LIVING CELL

Pathology of the Cell. By Gordon Roy Cameron, M.B., D.Sc.(Melb.), F.R.C.P., F.R.S. (Pp. 840; illustrated. £4 4s.) Edinburgh and London: Oliver and Boyd. 1952.

In his preface Professor Cameron tells us that his book "was commenced on the fateful day of June, 1940, when the capitulation of France was announced, and has been pursued without a break for close on eleven years." Writing it, he says, was "a wartime occupation which allowed of much evening quiet in the little Wiltshire village of Winterslow, famous for its association with William Hazlitt and his friends, Charles and Mary Lamb." The book started there in a modest way as "an effort to get clear the principles of pathology as they emerge from a study of the cell." It became "a more serious inquiry into the foundations of the cellular theory in general and of cell pathology in particular," and the initially modest effort became "a rigorous task of scholarship."

The book, which is divided into four parts, is remarkably well balanced. The first part, comprising about a fifth of the text, is on the normal cell. The second, concerned with the abnormal cell, occupies the main bulk of the volume. A critical discussion of the cell theory forms the third part, while the fourth is a forecast of the cellular pathology of the future.

While most of the text is occupied by a critical appraisement of our present knowledge of the normal and abnormal cell, the deep foundation of the cellular theory in the history of science and philosophy is heavily stressed, skilfully and critically analysed, and most attractively described in clear and lucid English. These historical chapters tell the story of the growth in men's minds of a biological concept whose origins lie in Greek philosophy, whose influence on discovery, progress, and expansion in the biological sciences has been profound, and whose adoption by Virchow elevated pathology to the status of a biological discipline and transformed it into a dynamic science. The account is enlivened by appropriate summaries of and quotations from the writings of the large company of philosophers and scientists whose thoughts and observations have played vital parts in the formulation of the cell doctrine. The part played by modern scientific philosophy is given an adequate place, four chapters of the book being entirely philosophic in outlook. One of these is a bold and successful attempt to define and examine the impact on biology and pathology of the abstract idea of purposiveness; the three others are largely concerned with the general reaction of modern scientific philosophy to the cell concept.

The inclusion of so adequate an account of the historical and philosophical background to the story of the cell clearly demonstrates the exceptionally wide perspective in which the author has viewed his subject. On the other hand, it should be emphasized that more than four-fifths of the book deals exhaustively with modern views and opinions, while special prominence is given to the application of recent discoveries in the physical sciences in the elucidation of the problems presented by the cell as a unit of life.

Cell morphology, the nature of protoplasm and the cell membrane, the modern techniques available for the investigation of the living cell, the processes of cellular multiplication, growth, ageing, and function, are the main subjects considered in the account of our present state of knowledge of the normal cell. The accounts of the cell membrane and the process of ageing in cells are outstanding.

The chapters on the abnormal cell form two sections. The first recounts the lessons to be learnt from the isolated cell and from unicellular organisms. It includes chapters on the effects of injury, heat, cold, and irradiation, and a long account of the effects of chemical substances, metabolites, bacterial products, viruses, and oxygen deficiency. The second section of this part is on the tissue cell, and about half of it is devoted to an authoritative account of the process of regeneration, a subject to which Professor Cameron has made substantial contributions. Another outstanding part of this section, also stamped by first-hand research experience, is the description of the processes of calcification and ossification. The story of the abnormal cell occupies eighteen chapters and covers a large part of the content of what is known as "general pathology."

Professor Cameron points out that, for at least a quarter of a century after the formulation of the cell theory and its adoption by Virchow, the investigation of cell structure was purely morphological and that the modern phase was ushered in by the discoveries of van't Hoff and Arrhenius, the accumulation of knowledge about catalysts and enzymes, and the demonstration of the close analogy between the properties of colloids and protoplasmic behaviour. New methods of attack now became available, and increasing attention was paid to the investigation of unfixed tissue and the living cell by means of the techniques of the physical and colloid chemists. We are now, the author claims, in a new phase in which the refinements of modern physical and chemical research are directed towards the highly complex problem of the nature of protoplasm. Giant molecules, birefringence, x-ray crystallography, the properties of monomolecular surface films, and lattices of changing permeability are now invoked to explain the physical state and essential heterogeneity of protoplasm. The author concludes that a rich harvest of knowledge will be gathered by the exercise of these disciplines. He says:

"I firmly believe that the time has come for a fresh attack on the nature of normal and injured protoplasm. I maintain that the future of cellular pathology will be determined by the energetic pursuit of problems of submicroscopic structure and function."

In three thoughtful and critical chapters towards the end of the book he examines the cell theory in the light of present-day knowledge. He believes that

". . . we are forced to the conclusion that the cellular idea, though immensely valuable, does not solve all questions and is not the only possible basis for a theory of the organism. . . . Cellular pathology has made and will make great contributions, but it cannot replace a pathology of the organism which sets out to interpret disease in terms of function and functional co-ordination without concerning itself too much with details of structural composition."

In the last section of the book, entitled "The Cellular Pathology of the Future," the author gives a very instructive and clearly written outline of the principles on which are based those parts of modern physical science used in the investigation of submicroscopic cellular structure. After this he discusses the interpretation of cytoplasmic behaviour in terms of the submicroscopic structure of the normal and injured cell. The latter section is difficult to follow without a fairly intimate knowledge of modern physics; it is a product of greatly restrained imagination, but neither futuristic in the artistic sense nor Vernesque in the literary. The final paragraph of the book, summarizing the difficulties which this modern scientific discipline will impose on those who subject themselves to it, reads:

"The handicap is the demands imposed on the research worker in the way of equipment and training. No mean knowledge of physics is sufficient if the biologist is to be master of this new discipline, and he must necessarily hesitate before involving himself in an arduous apprenticeship. The solution no doubt will come through the formation of teams of research workers representing the basic sciences involved in the problems.

This scholarly book is unique in the biological and pathological literature of the English-speaking world. Its publication is timely. It is highly critical but remarkably stimulating, and, given leisure and detachment, it is a joy to read.

GEOFFREY HADFIELD.

EMERGENCE OF THE N.H.S.

The National Health Service in Great Britain. By Sir James Stirling Ross. (Pp. 398. Diagram and map. 30s.) London: Geoffrey Cumberlege (Oxford University Press). 1952.

The purpose of this book is to provide a historical study of the emergence of a national health service in Great Britain. In the earlier chapters the author surveys the growth of publicly provided services from the first public health provision of a century ago up to the establishment of the National Health Insurance Service, the setting up of a Ministry of Health, and the growth of municipal hospitals and clinics side by side with voluntarily provided services. But the major part of the book is given over to describing the development of the National Health Service as we know it to-day, from the first policy-making days of 1939–43, through the White Papers, the debates, the conferences, the plebiscites, to the appointed day, and then on to 1952, giving a critical survey of what has so far been achieved and of the problems still awaiting solution.

The account of those controversial days in the 1940s has been well written. The author presents it fairly and objectively, with well-chosen quotation from contemporary documents and speeches. It brings back vivid recollections to those of us who were participants in the debates and the negotiations, as it takes us step by step through discussions with changing Governments from the planning to the establishment of the Health Service. It will provide for future generations of doctors, and for students of social history, a clear narrative of the way in which these far-reaching changes in the provision of medical care in Britain came about within the span of this single decade.

No less valuable will be the account of and the commentaries on the organization and establishment of the different sections of the Service. The author describes each in turn in its achievements and in its shortcomings, so that present and future readers will be well informed of the initial tasks that faced us all, whether we were participating as clinicians or administrators, and whether our field lay in the hospitals or in general practice, in public health or dentistry, or in nursing, midwifery, or pharmacy.

Throughout the book the emphasis is on the advancement of health, and the author's critical analysis is ever asking how much we have achieved; whether we have arranged our priorities correctly; whether we are spending our money to the nation's best advantage; what necessary services we are still laggard in providing. The three chief tasks which he sees as urgently needing greater effort, further research, and a more generous allocation from our budget for health are the treatment of chronic infirmity, of mental illness and defectiveness, and of tuberculosis. Mastery over these ills would bring not only economic benefit to the country but also "an immense gain in the betterment and happiness of our people."

Whether one looks to this book for the story of the coming of the Health Service, for a study of its present working, or for suggestions for its future improvement, it will be found always rewarding. Many may turn from its reading regretting that Sir James Stirling Ross had not greater space to discuss in more detail this or that sectional problem, but all will agree that it is a considerable achievement to have been able to bring within the covers of a single volume so much of historical interest and importance about so many different aspects of the developing pattern of the National Health Service in Great Britain.

A. TALBOT ROGERS.

CAJAL'S PRECEPTS

Precepts and Counsels on Scientific Investigation: Stimulants of the Spirit. By S. Ramon y Cajal. Translated by J. M. Sanchez-Perez, M.D.(Madrid). Edited and annotated by Professor Cyril B. Courville, M.D. (Pp. 180. No price.) Mountain View, California: Pacific Press Publishing Association. 1951.

This little book is founded on an inaugural address given by Cajal in 1893. It is noted that he spoke for three long hours, and, not having finished his address at the end of that time, he was pressed to give a second discourse and to embody his essay in a book. The present translation is from the sixth edition, which appears to have been revised in 1923. As these counsels were given by a master investigator some 60 years ago, it is not surprising to find that most of them are now generally accepted and have been assimilated in the current body of thought.

Cajal had a robust distaste for metaphysics, which, he said, "now inspires only feelings of aversion and compassion. Compassion because of the gifts dissipated pursuing chimeras; aversion because of the time and work so pitifully lost." He was not afraid to appeal to national pride, and we might all be happier if the aggressive instincts of the nations had been directed into competition in research rather than other forms of aggrandizement. In his time the antagonism between research and gainful practice was still strong, and he has a long section on the choice of a wife by the researcher, in which he advocates a modest wife of the middle-class. He had little use for the professional woman, saying that "as soon as she enjoys a talent and culture ordinarily thought of as belonging to men, a woman loses the charm of modesty, acquires dominating airs and lives in a perpetual state of exhibition of her cleverness and ability." He was a highly individual worker and inveighed against the offensive egotism of some professors and the exploitation of their apprentices. In fact, if some of his precepts were taken literally, they would lead to the abandonment of teamwork and the retirement of all professors at 55 at the latest. His description of instrument addicts still has a modern ring: "as fascinated by the gleam of the metal as the lark by its own reflection in the looking-glass." Enough should have been said and quoted to show that this is one of the classics of medical literature which can still be read with profit and amusement.

L. J. WITTS.

A NUTRITIONAL CATECHISM

The Principles of Nutrition for Practitioners and Students. By Professor C F. Brockington, M.A., M.D., D.P.H. With a foreword by Professor J. M. Mackintosh, M.D., F.R.C.P. (Pp. 137; 15s.) London: William Heinemann Medical Books Ltd. 1952.

In this handy little book Professor Brockington asks himself a series of leading questions on all aspects of nutrition, and answers them lucidly and enthusiastically. His topics range from early landmarks in discovery of the vitamins to the problems of producing food supplies for the world's ever-increasing population. Obviously he has kept his knowledge well abreast with the line of progress in many different fields of development. Thus several chapters are devoted to the significance of vitamins and minerals in the regulation of vital processes, while others are on the role of protein in growth and repair, the importance of carbohydrates and fats for producing heat and energy, dietary surveys and the work of dietitians, rationing, and food manufacture. By using the question and answer method the steps from one topic to another are made easily and clearly. Although there is occasionally a tendency to cause confusion by mixing up the subject matter—for example, in a simultaneous discussion of vitamins A and D—the book on the whole is pleasant and instructive to read.

According to current conceptions the nutrition expert must be at once a medical man, a chemist, and a sociologist. Few can fully satisfy these exacting standards, and Professor Brockington must be faulted for allowing his chemistry to become rusty. Fats and carbohydrates are certainly not hydrocarbons. Moreover, although the word "fat" may be taken in some contexts to include the vitamins which certain kinds of fat contain, the term "carbohydrate" properly refers to a class of pure chemical compounds. To say that "carbohydrate is often relatively, if not wholly devoid of essential nutrients" amounts, therefore, to an understatement of the obvious, if indeed it means anything at all. The assertions that starch exists in only one chemical form and that carbohydrate cannot be stored in the animal body are misleading; glycogen is generally considered to be a form

of starch, and it may be stored in considerable amounts in the liver. Carotene is converted to vitamin A by adding, not losing, two molecules of water. The international unit of vitamin A is 0.3 μg. of the preformed vitamin, not 0.6 μg., which is the amount applicable for carotene. It is to be hoped that such slips will be corrected in any future editions of this otherwise commendable work.

T. MOORE.

AGRICULTURAL SANITATION

Health and Agriculture in China: A Fundamental Approach to some of the Problems of World Hunger. By James Cameron Scott, M.A., B.Sc. (Pp. 279; illustrated. £1 5s.) London: Faber and Faber. 1952.

In the problem of world hunger there are two main elements —on the one hand the factors limiting food supplies, and on the other the requirements of increasing populations. Aspects of both have been widely discussed in recent years. This book is mainly concerned with the hazards of the return to the soil of plant nutrients available in waste products—vegetable, animal, and human. "Some writers have described in glowing terms the wonderful ingenuity and infinite patience of Chinese farmers in utilizing all human excreta in their agriculture, but they have failed to tell of what it has cost in terms of ill-health and loss of human life." Professor Scott and his colleagues are concerned with the spread of diseases by bacteria, protozoa, helminths, and possibly poliomyelitis by a virus, in faeces. They have studied the prevalence of infection with *Ascaris lumbricoides* as an index of the state of sanitation of the environment. There is no doubt from the data presented in this work of the seriousness of the amount of illness and death which can be caused by faecal-borne disease.

Evidence is given of the importance of returning wastes in the maintenance of soil fertility. Admirable as the methods of the farmers of 40 centuries may have seemed, those studied in North China fail to conserve more than half the nitrogen. The results are given of experiments—incomplete owing to the Japanese occupation—on the preparation and storage of composts, including some chemical analyses and field trials of fertilizer value. Special investigations were made of the relation between methods of composting and the survival of ascaris eggs and protozoan cysts, as well as the control of fly breeding. This last aspect entailed entomological studies, which are reported.

The methods of composting examined differed from the main traditional methods chiefly in the substitution of soil by organic wastes, with improvements in the fertilizing value of the final product, in which there were no living ascaris eggs.

The author invites attention to public health problems in other parts of the world than China and gives a few glimpses of attempts made to solve them. He also briefly considers problems related to what he calls "agricultural sanitation." He rightly insists that the time is probably ripe for "a much larger and more co-ordinated attack on these problems." "The principles are clear, the techniques can be mastered, and willing men and women of determination and good will could use them for the benefit of mankind." "Where," he asks in conclusion, "are these men and women?"

B. S. PLATT.

PLANNING FOR BATTLE CASUALTIES

Battle Casualties: Incidence, Mortality, and Logistic Considerations. By Gilbert W. Beebe, Ph.D., and Michael E. De Bakey, M.D. (Pp. 277. £3 17s. 6d.) Springfield, Illinois: Charles C. Thomas. Oxford: Blackwell Scientific Publications. 1952.

The authors claim, probably quite justly, that this book is "essential information for the surgeon who must plan for the care of large numbers of battle casualties," but it is an almost impossible book for a simple surgeon to review, as its many statistical tables and logistic diagrams are difficult of comprehension to the mere operating surgeon.

There is no doubt that very thorough work has been done on the incidence of hits and wounds, their location, and on death from wounding, while the chapter on effectiveness of weapons is certainly convincing. All this information will undoubtedly be very useful in planning hospital treatment, accommodation, and evacuation at the beginning of any future war. I am, however, of a sufficient age to have taken part in three wars, and it is my experience that the knowledge carefully gained and compiled as a result of war experience in any particular war is of little value in subsequent wars, because of altered weapons and altered conditions and new developments influencing medical treatment.

The chapter on logistics has frankly left me gaping, though I feel sure it is accurate, and especially do I agree with the proposition under military consideration that "the farther a wounded soldier is evacuated from the combat zone the greater will be the number of non-effective man-days and the less will be his motivation for return to combat duty."

Finally, I would commend this book to the Army medical authorities, the Ministry of Health, and other bodies on whom in this country rests the planning of sorting, evacuating, and hospitalizing the wounded and sick with the object of returning the maximum number of men fit for duty in the shortest possible time.

P. H. MITCHINER.*

*This review was completed by Mr. Mitchiner just before his death in October.

THE WESTMINSTER

Westminster Hospital: Two Centuries of Voluntary Service, 1719–1948. By J. Langdon Davies. (Pp. 274. £1 1s.) London: John Murray. 1952.

Although the voluntary hospitals, with few exceptions, have been merged into the mass of State-controlled institutions, we hope and believe that the many merits of the voluntary system may be incorporated into the new regime while some of its weaknesses may be corrected. For this to be done one must realize the tradition of loyalty to a high ideal which characterized many of the best of these hospitals, and learn how much labour, trouble, and disappointment were experienced before that ideal was reached.

The history of Westminster Hospital, as written by Mr. Langdon-Davies, will help the present generation to imagine the uphill struggle to reach the summit of the modern hospital efficiency. He portrays vividly, and in a novel manner, the social conditions at various periods of the hospital history, and in separate chapters describes the progress of medical knowledge, the changes in nursing, the alterations in administration, the outstanding personalities of the medical staff, and finally gives a justifiably glowing account of the present imposing hospital edifice. The author has drawn his facts from many sources, from the remarkably well-kept hospital archives, from Mr. Spencer's shorter account and unpublished notes, and from personal contact with many of the hospital staff. The book is written in an interesting style. We liked the epigram about hospitals: "A hospital is, of all social institutions, the one in which perhaps the greatest mixture of motives, the most incompatible ambitions, and the most vexatious vested interests are thrown together." That may have been true of the old-time hospital, but matters have changed.

This is a book which will be read with great interest, not only by those attached to Westminster Hospital by association or training, but by all doctors, nurses, medical students, and hospital administrators, for it gives a panoramic view of the gradual improvement in sanitation, nursing, medical treatment, and education over the past 200 years. Moreover it is extremely readable. Finally, a word of praise for the lovely coloured picture of the hospital and the fine armorial bearings which are reproduced so artistically.

V. ZACHARY COPE.

BRITISH MEDICAL JOURNAL

LONDON

SATURDAY NOVEMBER 29 1952

INTERFERING WITH CELL METABOLISM

To many medical men the name of Sir Rudolph Peters and the School of Biochemistry at Oxford recall important work on the function of vitamin B_1 in brain metabolism and the development of dimercaprol (B.A.L.) for the treatment of poisoning by arsenic and some other metals. Their work, carried out far from the bedside, has had an immediate and important bearing on the understanding and treatment of disease. The story of the research work that led to dimercaprol was first made public only some time after it had been completed, for it had begun as a study of the mode of action and methods of treatment for injury by lewisite, a potential war gas. For the past five years Peters and his colleagues have been making a similar study of poisoning by fluoroacetate. Although once believed to be a potential weapon, fluoroacetate has now fortunately been relegated to the role of a rat poison, and we are therefore privileged to read of the work being done as it proceeds. In our opening pages Peters takes one step further the penetrating account of his attempts to solve a biochemical jigsaw puzzle and at the same time presents a summary of the whole story.

Those of our readers who have had no time to keep abreast of modern developments in biochemistry may find it hard to follow the story Peters has to tell or to appreciate the difficulties he and his colleagues have overcome in the course of their work. And it is not easy to simplify the account without at the same time robbing it of much of its meaning. If we attempt to explain the significance of the work, it is with the realization that the author himself could not risk impairing a scientific presentation by attempts at oversimplification.

In the older textbooks of biochemistry enzyme reactions were usually depicted by arrows running to and fro in straight lines. This was to indicate the fact that the reactions they catalysed were theoretically reversible, though in fact they often proceeded only in one direction. To-day such simple pictures are replaced by large circular diagrams, of which Peters gives simplified versions. Each of these circles may be made up of half a dozen or more different enzyme reactions which follow one another in a fixed succession.

The simple conception that glucose was oxidized or burnt in a succession of stages to water and carbon dioxide in order to provide energy for the work done by the body is now obsolete. In the modern view pyruvate, which may be formed from many sources, including glucose, is a very important compound. The energy liberated both in its formation from more complex substances and in its oxidation to carbon dioxide and water is used to perform much of the work of the body. Much of metabolism may be viewed as a series of cycles which pass through pyruvate at one stage. It is with the cycle involving the oxidation of pyruvate, the tricarboxylic cycle as it is called, that the work with fluoroacetate is concerned. The part of the pyruvate that is to be burnt to provide the energy for some of the other cycles in which the rest of the pyruvate is built back into other compounds is first burnt to acetate, and this is linked with a substance called oxalo-acetate to form citrate. This citrate then goes through a series of changes mediated by enzymes. They result finally in the reappearance of oxalo-acetate ready to combine with more pyruvate or acetate, which has meanwhile appeared as a result of further tissue activity; and so the cycle continues. The carbon dioxide and water are released when the citric acid is being attacked and gradually changed again to oxalo-acetate.

Each living cell contains a great many enzymes. During the past few years it has been shown that many of the important enzyme systems are contained within those small intracellular bodies long familiar to histologists as mitochondria. The mitochondria, which are almost a cell within a cell, can be separated and studied alone. The practical importance of this fact, which is well illustrated by some of the work Peters describes, is that a substance that can enter a cell may not necessarily interfere with an enzyme reaction if this reaction takes place within the mitochondria of that cell. The interfering substance must be capable of being assimilated by the mitochondria as well as being able to penetrate the cell.

Fluoroacetate is a stable compound. When injected into the body it is apparently taken up by the cells in the same way as they take up acetate formed from pyruvate in the first stages of the latter's oxidation. The fluoroacetate thus taken up is condensed with oxalo-acetic acid to yield a citric acid

(fluorocitrate) containing the fluorine of the fluoroacetate. The citric acid is then attacked by a series of enzymes; this results in its conversion back again to oxalo-acetate and the liberation of carbon dioxide and water. But the enzyme that deals with citric acid successfully is apparently unable to deal completely with fluorocitrate. If it ignored it, all would be well, but instead the enzyme presumably takes up the fluorocitrate, attempts to change it, but is in some way prevented from doing so by the fluorine in the molecule, and the fluorocitrate remains "stuck in the gullet" of the enzyme. As a result of this all the other citrate which is being formed meanwhile from the normal acetate is unable to reach the enzyme, and, as it cannot be changed, it accumulates. The animal may therefore be poisoned in two possible ways. In some vital tissues the normal processes of energy formation and conservation are upset because the breakdown of the citrate and liberation of carbon dioxide and water are prevented by the blocking of the enzyme that normally does this. Alternatively, the tissues may be poisoned by the local accumulation of citrate, and this may immobilize calcium or other metals which may be essential to some enzyme reactions. Animal species vary in their reaction to fluoroacetate. Some die of cardiac failure, while others show disturbances of the central nervous system. It is possible that the former are sensitive to citrate poisoning but can find an alternative pathway to supply their energy, while the latter fail to provide such an alternative pathway and die because the energy requirements of their nervous tissue cannot be met.

Peters and his colleagues have been able to isolate an acid containing fluorine and, like citric acid, also containing three carboxylic groups. It has not been possible to identify this acid with certainty, but a synthetically prepared fluorocitric acid was found to have half the activity of the acid isolated from poisoned tissues. This would be expected if the synthetic acid was a mixture of active and inactive isomers. Thus fluoroacetate acts as a poison because it is caught up in the body's metabolic process and synthesized as if it were ordinary acetate to form a new compound that the body's enzymes cannot deal with.

This provides another excellent illustration of the way in which metabolism may be upset by presenting the tissues or cells with something closely resembling a normal cell constituent. A similar explanation was provided by the classical work of Woods on the action of sulphonamide, which closely resembled but could not replace a vital growth factor for some bacteria. If a foreign substance presented to the tissues is too unlike a normal metabolite, the cell and its enzymes may ignore it, and the substance will not prove poisonous. Peters makes a distinction between the toxic syntheses illustrated by the present example and toxic conversion whereby a non-poisonous compound becomes changed by the body's own metabolic processes into one that is poisonous. Such a conversion is almost certainly carried out by an enzyme, and it comes about only because the substance converted is attacked by an enzyme which is unable to distinguish the poison from its natural substrates. Both cases serve to illustrate the subtlety of action of some poisons. Fluoroacetate is poisonous to mammals and insects but is not poisonous to plants. It is found naturally in some plants and is also a very effective systemic insecticide, because it can be absorbed by plants and kills only the insects sucking the juice of these plants. This means that the energy metabolism of plant cells must be carried out by a different process or by less sensitive enzyme systems. This in turn explains why it is possible now to kill bacteria in the body without injuring the host. As Peters points out, a study of fluoroacetate poisoning may one day make it possible to kill a virus without causing irreparable harm to the cell in which the virus is multiplying. By advances of knowledge on similar lines it may one day prove possible to introduce a substance into the patient with cancer which will be taken up avidly by the malignant cells, only to be converted into something which then poisons them, while the normal tissues ignore this strange compound because it does not readily fit into their metabolic pattern.

Some may have thought twelve years ago that the detailed study of how a war gas exerted its effects would be exceedingly limited in scope, but the final triumph of mercaprol treatment stands as a reminder of their mistake. So, too, some may feel that fluoroacetate is hardly worthy of such detailed study, but, as Peters says, "Toxic agents are now being employed by biochemists to map out the course of metabolic events *in vivo*." So do the boundaries between the once separate subjects of biochemistry and toxicology, like so many other boundaries in science, become more difficult to discern. We look forward to reading more about this work. No attempt can be made to prophesy the practical benefits to clinical medicine that may follow, but from the privileged position of a ringside seat we have already been told enough to appreciate the additions that have been made to our understanding of how the body performs its amazing metabolic tasks.

THE CENTRAL MIDWIVES BOARD

After nearly a century of active controversy the first Midwives Act reached the Statute Book in 1902, and in December of that year the Central Midwives Board, set up to administer the Act, held its first meeting. After 50 years of invaluable service the board will celebrate its jubilee on December 3 at a function presided over by Dr. Arnold Walker, the fourth of a distinguished line of chairmen, and the Minister of Health will be the principal guest. The occasion will serve to contrast the outlook of the present day with the *laissez-faire* attitude towards maternity and child welfare which existed 50 years ago when the board first assumed office. At that time the delivery of the large majority of the nation's babies was presided over by women who were uneducated, untrained in the modern sense of the word, and unsupervised. That such a system—if such it can be called—should have persisted in England long after other European countries had regulated the practice of midwifery speaks much for the inviolability of British custom and tradition. One may wonder, too, how much the course of legislative reform was hindered because the voters and their parliamentary representatives were of a sex lacking in personal experience of childbirth. The calls of reformers were also stifled by Victorian prudery, which forbade any rational public discussion of an indelicate subject and which ordained that in conversation pregnancy should be relegated to the mysteries of an "interesting condition."

The British Medical Association had sought unsuccessfully to promote Bills in 1879 and 1884, and the future was foreshadowed in the action of the Obstetrical Society of London in 1871 when, in an attempt to raise the standard of midwifery practice, it decided to grant a diploma to midwives who showed a minimum of efficiency. In 1881 the Midwives Institute was established with the object of "raising the efficiency and improving the status of midwifery." But there were no recognized courses of instruction and no restriction of the activities of women without a diploma.

It was against this background that the Central Midwives Board, fortified by the provisions of the Midwives Act, had to undertake the pioneer task of creating out of chaos a body of trained, registered, and supervised midwives. It had powers, not wide enough, to restrict the practice of women not on its register, but perforce it had to admit any who had been in regular practice for one year. Thus it was upon the new entry that it had to build for the future. The Act of 1902 established the pattern of administration, still maintained, of a central statutory body using the county and county borough councils as its local agents in the general supervision of the midwifery profession. It speaks well for the soundness of this partnership that its work has been undisturbed by the effects of the many ensuing health enactments. The board still reigns supreme over the professional affairs of midwives by whatever authority they may be employed. How beneficent has been its rule is reflected in the story of the rise to the high professional status which the midwife enjoys to-day, with public recognition as a practitioner in her own right. It is fitting that the College of Midwives, the successor to the original Midwives Institute, was honoured by command in 1947 to assume the Royal prefix.

The Central Midwives Board when it assembles next month may congratulate itself on the fulfilment of its original task. Its continuing work will be the maintenance of a high standard of midwifery, and most important among its tasks will be the training, including postgraduate education, of first-class midwives. The medical profession will look forward to ever-increasing co-operation with their midwife colleagues.

RETROLENTAL FIBROPLASIA

Recent work on retrolental fibroplasia indicates that there is now enough evidence to warrant a critical assessment of the significance of oxygen in the development and possible treatment of the condition. The designation retrolental fibroplasia, introduced by Terry in 1944 for a condition he had first described two years previously, apparently as a pathological curiosity, has now become recognized as an unsatisfactory name for an affection that is unfortunately fairly common. A recent account of the condition was given by Bembridge and his colleagues in this *Journal*.[1] As observations have accumulated it has become obvious that the cyclitic membrane behind the lens, to which the name refers, represents an advanced stage of a disease with a fairly rapid course, and that the early stages are characterized by vascular anomalies of the retina. The suggestion that the affection should be designated retinopathy of prematurity[2] does not take matters much further, but does at any rate emphasize two significant clinical aspects. It is now accepted that the disease is confined largely to infants weighing less than 4 lb. (1.8 kg.) at birth. Some 85% fall into this group, and most, perhaps all, of the remainder show a weight of not more than 5 lb. (2.3 kg.). There is some evidence that the lower the weight at birth the greater is the likelihood of retrolental fibroplasia. In one series—typical of many others—the incidence of retrolental fibroplasia was 29% for infants weighing less than 3 lb. (1.4 kg.)

and 10% for those weighing 3 to 4 lb. Whether it is weight at birth or gestational age of the infant that is at issue is still undetermined. Prematurity of the order of 8 to 11 weeks appears to be an essential factor, though cases have been reported in infants who were apparently born at full term. It would seem that it is prematurity itself, and not its underlying cause, that is responsible, for the affection is seen in all varieties of prematurity irrespective of its cause.

As the early stages have come to be recognized, it has become clear that, though the affection is bilateral, the two eyes are not necessarily equally affected, and that fortunately spontaneous regression at the early stages is not uncommon. Histologically, too, there has been considerable clarification, and vascular anomalies—sometimes simulating haemangiomata—have been found to be a constant occurrence in early cases. Some observers have stressed the association of haemangiomata on the skin and possibly elsewhere in the body. Whether these associations are unusual in premature infants without retrolental fibroplasia does not seem to be established. Except for the occasional presence of mental defect, there are generally no other congenital anomalies in affected infants.

The frequency of the condition appears to vary not only from country to country, and from town to town, but even in different hospitals within the same town. Though there is nothing to indicate that there is a seasonal variation, the occurrence of fluctuations over several years has led to the suggestion that retrolental fibroplasia is an infectious disease, and a virus aetiology has even been proposed on rather slender evidence. For reasons not always convincing excision of the retrolental mass, radiation, administration of vitamins, A.C.T.H. therapy, blood transfusions, various dietetic supplements, and oxygen therapy have all been tried, and found wanting. Experimentally, evidence has been adduced that deficiency in vitamin A, vitamin E, or of oxygen, as also an induced oedematous state, cause ocular malformations suggestive of retrolental fibroplasia. In the medley of reports on the general state of the infant, and on the health of the parents, especially on the general and obstetric health of the mother, nothing tangible has emerged to indicate a possible cause of the affection, while studies on racial distribution have suggested that the disease is rare in Negro infants. Geographical differences have been stressed, but these may be mainly a matter of clinical knowledge travelling slowly. As can be seen from Leona Zacharias's excellent survey of the literature,[3] more and more cases are being reported from countries where the affection was previously held not to occur.

In this mass of negative data there is no answer to the fundamental question whether retrolental fibroplasia is a congenital affection that becomes manifest in the surviving premature child or whether the anomaly is an acquired disease. Earlier views ascribing the basic lesion to a persistent primary vitreous giving rise to haemorrhage and subsequent organization are now no longer held. It is generally agreed that the infant who will develop retrolental fibroplasia shows no definite anomaly at birth, except perhaps some vitreous haze, which may well be physiological in the premature. But this does not dispose of the possibility that the retina may be abnormal at birth, though the supporting histological evidence brought forward by Reese and his associates[4] is hardly conclusive. They examined 458 eyes of stillborn and newborn infants and could find only two sets of eyes in which there was a lesion which they regarded as identical with the early stages of retrolental fibroplasia. On these findings they conclude that retrolental fibroplasia may be present at birth—but grant that in the large majority of cases there is no demonstrable clinical evidence of the disease at birth.

One possible method of solving this difficulty does not seem to have been explored to any extent. Multiple births are regarded as the commonest cause of prematurity, and it is therefore not surprising that a high proportion of retrolental fibroplasia has been recorded in twin births. If the condition is inherent in the foetus, both of a pair of monovular twins should more frequently be affected than two binovular twins. One group of observers[5] have suggested that when both members of a set of twins are affected they are usually uniovular. That both of a pair of binovular twins can be affected seems well established, but whether this is a frequent or occasional finding is not known. A systematic study on these lines is needed.

For the present it would seem that some environmental factor in the development of the premature infant is the likely cause of the affection. A number of observers have stressed the possibility that the oxygen administered to the infant might be the precipitating factor, and that differences in the incidence of retrolental fibroplasia at different clinics might well be due to differences in the use of oxygen in the management of the infant. Some inconclusive evidence has been given by several observers that the scarce use of oxygen in units for premature infants leads to a low incidence of retrolental fibroplasia, but evidence to the contrary has also been adduced.

1 *British Medical Journal*, 1952, **1**, 675.
2 Heath, P., *Amer. J. Ophthal.*, 1951, **34**, 1249.
3 Ibid., 1952, **35**, 1426.
4 Ibid., 1952, **35**, 1407.
5 Speert, H., *et al.*, *Amer. J. Obstet. Gynec.*, 1950, **59**, 246.
6 *Amer. J. Ophthal.*, 1951, **34**, 1649.
7 Ibid., 1952, **35**, 301.

There are centres where oxygen is used freely and no cases have been observed; likewise there are centres where there has been an increase of retrolental fibroplasia in spite of no change having taken place in the oxygen treatment of the premature infants. Even more suggestive is the fact that there are instances of retrolental fibroplasia in babies who have had no oxygen treatment at all.[3] None the less there remains the possibility that the administration of unphysiological concentrations of oxygen to a premature baby may well stimulate an abnormal development of the retina—a tissue particularly dependent on oxygen—and it is also possible that the suspension of oxygen therapy may produce a relative anoxia which is also deleterious. This is suggested by some observations on babies recorded by Szewczyk.[6,7] He found that the early stages of retrolental fibroplasia could be induced in premature infants by removing them suddenly from an oxygen atmosphere, and that these changes regressed on putting the babies back in an atmosphere with a suitable oxygen pressure. He also found that oxygen therapy (concentration 60–70% in the inspired air) is effective treatment for early retrolental fibroplasia. In this procedure slow weaning from oxygen is regarded as essential.

One difficulty in the study of this blinding condition has been the fact that, though the condition is relatively common, few observers have the opportunity of seeing many cases, and case reports from different centres using different classifications are difficult to compare. A proper assessment of the significance of oxygen in this condition will be difficult owing to the variable course and spontaneous regression seen in early cases. The broader issue still remains, and it is likely that elaborate and carefully planned studies by ophthalmologists, obstetricians, paediatricians, and geneticists collaborating in a team—on a uniform plan in many centres—will be needed before a final solution can be obtained.

HUNGER AND APPETITE IN INFANCY

Paediatricians are agreeing that there is little reason why the human infant, unlike other young animals, should have its feeding-times imposed by external authority, however benevolent. The method of "self-demand" feeding is not new, and a walk through the fields in the spring will demonstrate how simply it may be practised when parent and offspring are primarily concerned with the satisfaction of hunger. Those who recall Edwardian days will remember, too, that it was not uncommon for the bosom of the nursing mother to be shyly exposed, whether in drawing-room or public conveyance, in response to the infant's need. This self-demand feeding is the logical conclusion of the more humanistic infant care which has been practised progressively for the last 30 years. The tedious analyses of breast milk, the complicated feeding formulas, the vast clinical and chemical miasma which surrounded simple underfeeding (marasmus, athrepsia, and so on) have all disappeared, to be followed in the discard now by the rigid time schedules. The voluble exponents of three- and four-hourly feeding programmes sulk in their respective corners. Again it should be emphasized that all this is not so new. There must have been few medical parents of the nineteen-twenties and -thirties who, having tried the fixed feeding-times for their babies, did not feed these hungry children when they wakened in the night, and, having practised heresy successfully at home, then preached it abroad. Drs. J. D. Hay, P. D. Moss, and M. M. P. Ryan, confirming the experience of Illingworth and his colleagues,[1] now record that self-demand feeding can be satisfactorily instituted in the maternity hospital. The obvious advantage of the method both in hospital and at home is that it makes easier the life of both mother and child. The anxious mother is less harassed, the obsessional mother takes a lesson in the virtue of "no rules," while the baby grows up in a world where its just demands are met and not frustrated. Most of the difficulties in infant feeding were man-made,[1] and they have now been greatly reduced.

It is natural that the baby, having been allowed to dictate the time of its feeds, should now be permitted to determine their quantity. Dr. I. G. Wickes[2] maintains that there is still a morbid and widespread fear of overfeeding, and when studying a group of 503 healthy infants he found that only 57% of the artificially fed infants were satisfied with their feeds. He suggests that both the standard formulas—2½ oz. (70 ml.) or 50 calories per lb. (450 g.)—and the expected weekly gains are inadequate during the first two months of life. In his series the median weekly gain in the first two months was nearly 9 oz. (250 g.) and the optimal weekly gain approximately 1 lb. (450 g.). Such contentions obviously raise much more difficult questions than does the simple practice of feeding babies when they are hungry. Infants, like adults, can become conditioned to overfeeding as to underfeeding, and there are good physiological reasons why the appetite grows as it feeds. Obviously some definitions are required, and if a weekly gain of 1 lb. in the first two months is regarded as "optimal" one must ask whether this means optimal for growth, for weight, for nutrition, or for health. Dr. Wickes, who writes about overfeeding in this issue (p. 1178), realizes that, if the rations are to exceed the previously accepted standards, then the possibility of overfeeding becomes important. His investigations show that, although overfeeding is not the common hazard it is popularly supposed to be, yet it does occur. If weight gains up to 1 lb. weekly are to be allowed in the absence of gastro-intestinal disturbance, then once more the edges of definition become a little blurred. Having escaped from their marasmic past, are our babies now to enter upon an obese future? A rational feeding policy will allow the infant to be fed when it pleases.

[1] Illingworth, R. S., Stone, D. G. H., Jowett, G. H., and Scott, J. F., *Lancet*, 1952, 1, 683.
[2] Wickes, I. G., *Arch. Dis. Childh.*, 1952, 27, 449.

and as much as it pleases, either of breast milk or of an artificial feed with a value of 50 calories to the ounce, provided there is no gastro-intestinal disturbance and no excessive deposition of fat. If the paediatrician's eye and hand are not equal to the assessment of fat deposition, then something might be made of weight-height ratios, but this would be to create fresh difficulty where all is now simple.

MEASLES

In recent weeks the numbers of measles notifications have been unusually high for the time of year,[1] though like nearly all the common infectious diseases measles is now much less serious as a cause of death than it used to be. Thus in 1949 in England and Wales the death rate per million aged under 15 years was 30, as compared with 420 in 1921–5. This remarkable reduction has been progressive throughout, although the decline has been more abrupt in the last few years. And the fall in mortality has been accompanied by a reduction in the number of cases registered. No doubt a number of factors have combined to produce this change, among which may be mentioned improvements in child care, and perhaps a general raising of the standard of nutrition and a reduction in the size of family. But the more recent acceleration of the fall in mortality may reasonably be credited to treatment with sulphonamides and penicillin.

Not that these drugs have any effect on the measles virus: their action is solely on the secondary bacterial invaders. These take advantage of the destructive action of the virus on the respiratory mucosa and were in the past the main causes of measles deaths. Thus the bronchopneumonia of measles responds excellently both to sulphonamide and to penicillin. In the young child it is probably wise to start treatment with penicillin, for the prognosis is the more severe the younger the child, and the bactericidal effect of penicillin may be advantageous. But, if pneumonia is the most dramatic of the complications, more attention should be paid to an often neglected complication of measles—namely, otitis media. It is rarely fatal, but mismanagement of it may lead to permanent disability. With modern therapy almost every case of acute otitis can be cured, usually within seven days. Intensive penicillin therapy should be the first line of attack. If this does not produce rapid amelioration, then bacteriological assistance should be sought at once and an appropriate antibiotic chosen from the many now available. Chronic otorrhoea is usually preventable, and early recognition of acute otitis is the best way to prevent it. Is it too much to suggest that the routine examination of a child in the early convalescent stage of measles should include an inspection of both drum-heads? Many cases of otitis develop insidiously, especially in young children, and reliance on complaint of pain or on the observation of a discharge is inadequate.

The prevention of measles by passive immunization with intramuscular injection of gamma globulin during the incubation period is now a procedure of proved efficacy. But gamma globulin is scarce and expensive, so that the physician must always be convinced that its use is really desirable. In the child aged between 6 months and 1 year prevention may be desirable, more especially if there has been some previous debilitating condition. But it is essential that contact with the measles case has been close, particularly in the period immediately before the rash appears, and that the date of contact is accurately known. Gamma globulin is probably largely wasted when it is used after the sixth or seventh day of incubation. Above the age of 1 year it is usually wise to allow the child to "get it over." Zeal for prophylactic injections is excellent when the immunity conferred is of long duration, but measles is a malady which must eventually strike most of those who live in towns. It is better to have done with it in early life than to lay it up as a hazard for the young adult—perhaps before some important examination.

[1] See graph at p. 1214.

SUBCONVULSIVE ELECTRICAL STIMULATION

In this issue Drs. Spencer Paterson and A. Conachy describe (p. 1170) the use of apparatus to cause electrical stimulation of the brain at a lower level than that required to bring about an epileptic convulsion. These two distinct uses should not be confused. When a convulsion is required, the leads are placed over the forehead, so that the frontal regions feel the effect of the shock. It is generally considered that a more posterior placing might prove dangerous. With the method Paterson and Conachy describe, using a weaker electrical discharge, there is no such danger; the electrodes are placed over the temporal region, and it is thought that by this means the diencephalon is stimulated.

The clinical effects are also quite different from those obtained from the standard use of "electro-shock." Instead of being convulsed, the patient, after application of the current under thiopentone anaesthesia, becomes weepy and emotional. This emotional state may then be used for therapeutic purposes, to induce the patient to talk freely about his feelings and problems, to aid the rapport between doctor and patient, and in some cases to bring about an emotional outburst or abreaction. Paterson and Conachy also think that, quite apart from these effects, the stimulation of the diencephalon alone has therapeutic value. Much further work will be required to prove that there is an effective stimulation of the diencephalon, and that it is therapeutically valuable.

The aiding of rapport, the inducement of the patient to talk, and the production of an abreaction are all a part of psychotherapy, however much they depend on the use of physical means. Therapeutic measures of this kind are applicable to psychoneurotic patients, whereas electro-shock of the usual kind is principally beneficial in psychotic states, especially in cases of depression. The patients whose treatment Paterson and Conachy describe were mainly suffering from neurotic or psychopathic states. They report that clinical results were better if an abreaction was obtained, and it seems probable that the usefulness of the method of subconvulsive stimulation depends on its capacity to aid abreaction.

It is important that this new form of abreactive treatment should not raise greater expectations than those which would be justified by our experience of producing the same result by other means. Abreactive treatment was the basis on which psycho-analysis began its long career, and it was then produced psychogenically under hypnosis. Since then it has been produced with the aid of intravenous hypnotics, the inhalation of ether, or of a mixture of carbon dioxide and oxygen, and by the injection of stimulants such as "methedrine." Whenever a clinician begins a new method he starts with high hopes and obtains a fair measure of satisfactory results. The method he employs is then extended to every variety of psychiatric patient, with progressively decreasing success. In due course a new method takes its place. The long experience with abreactive methods of all kinds which has now been gathered suggests that the patients who respond well to such treatment form a limited group. By far the most satisfactory are those with a hysterical illness starting from a traumatic episode and whose personalities are not so unstable as to be beyond restoration. The use of abreactive techniques with psychopaths, depressives, obsessionals, and other groups has always so far been disappointing in the long run; and, unless subconvulsive treatment discloses qualities which are unprecedented, there is no reason to think that it will have any wider sphere of application.

ANAESTHETICS AND THE HEART

Presented with a "heart case," the anaesthetist who knows little of cardiology generally calls on a physician who knows nothing of anaesthetics; the result is often a note on the case-sheet that satisfies neither of them. In a recent article[1] a cardiologist, Dr. G. W. Hayward, clears much of the vague thinking on this topic. He reassures anaesthetists that most patients with cardiac disease tolerate major surgery well: the risk is little higher than in other subjects, and the strain of an operation is generally less than that of moderate physical exertion. If the patient is in congestive failure, surgery should be postponed until the failure has been treated; if the operation is an emergency—and some surgeons would classify a carcinoma as one—rapid digitalization should first be undertaken.

Anoxia is poorly tolerated by patients with cardiac disease, particularly those with angina pectoris, aortic valvular disease, heart block, or a history of recent coronary thrombosis, and it may lead to the first signs of failure. A sudden fall in blood pressure carries a similar risk. Hayward points out the difference between the hypotension of haemorrhage, which is accompanied by vasoconstriction and increases the work of the heart, and that caused by the methonium compounds. Hypotension produced by these drugs (or by widespread spinal or epidural analgesia) is associated with generalized vasodilatation, and although the output of the heart is increased its work is lessened by the lower peripheral resistance. The metabolic needs of the myocardium are reduced, and it is unlikely that coronary insufficiency will occur if the coronary arteries are healthy; but if these arteries are narrowed by disease adequate oxygenation of the heart muscle depends on the blood pressure, and hypotension from any cause may produce coronary ischaemia. Deaths from cardiac infarction have followed small doses of hypotensive drugs given therapeutically,[2] and Wyman[3] has seen electrocardiographic changes representing myocardial ischaemia for some days after their use. It is an elementary precaution for the anaesthetist to withhold such drugs in patients with manifest arteriosclerosis; but the danger lies in coronary heart disease being sometimes wholly symptomless and without clinical signs or changes in the electrocardiograph—the patient may be an apparently healthy young man with normal peripheral blood vessels. Hayward's paper is another warning that "controlled" hypotension should be used only when a bloodless field is essential for the operation, and not for the assumedly beneficial effect of reducing blood loss to a few millilitres.

1 *Anaesthesia* 1952, 7, 67.
2 Livingstone, D. F., *British Medical Journal*, 1950, 2, 713.
3 Ibid., 1952, 2, 156.

INFLUENZA VACCINE TRIALS

This winter 15,000 volunteers are to take part in trials of a vaccine that has been developed to give active immunization against virus-A influenza. The Medical Research Council is carrying out the trials with the help of industrial medical officers, general practitioners, medical officers of health, and the Public Health Laboratory Service. The trials are to start in early December, when half the volunteers will be inoculated with the new vaccine and the other half with an old type of vaccine, so that results in the two groups may be compared. The four countries of Great Britain are to be covered, and in addition a special trial will be carried out in a number of villages in the Isle of Lewis. The volunteers comprise factory workers, hospital nurses, university students living in hostels where there is a doctor in charge of student health, and members of the Services. The arrangements for the trials are now complete, and instructions are going out to all who will take part in them. If any of the factory workers fall ill, they will no doubt be seen in the first place by their family doctor or factory doctor, and close co-operation between these is essential for the success of the trials. Medical officers of health may also be able to give valuable help in collating and imparting information on outbreaks of influenza in their area.

The size and complexity of the trials, including the need for specialized laboratory investigation where necessary, make the fullest collaboration between all concerned an intricate and essential feature of the enterprise. This is the first large-scale investigation to be carried out by the Medical Research Council into an influenza vaccine, and its desire for help from those taking part will be shared by everyone for whom the severe epidemic of 1951 is a fresh and unhappy memory. If any detailed information is required it may be obtained from the secretary of the Medical Research Council Committee on Clinical Trials of Influenza Vaccine, at the Ministry of Health, 14, Russell Square, London, W.C.1 (telephone: Museum 6811, extension 23).

REFRESHER COURSE FOR GENERAL PRACTITIONERS

SCABIES AND LICE

BY

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An infective organism such as the meningococcus on finding a congenial soil flourishes and sets off an epidemic, but in the course of time, even without the aid of medicine, the case incidence declines and the epidemic comes to an end because the community has gained some degree of immunity.

Those ectoparasites of man, the itch-mite and the louse, given the opportunity, will also multiply and spread themselves far and wide until the disorders they cause assume epidemic proportions. Unfortunately the body does not become immune to them, though certain people do not seem to be incommoded by their parasites, and the epidemic is usually brought to an end only when the public health authorities get an almost complete control of the parasites. Quite apart from times of war, the incidence of infestation varies from year to year. The number of cases of scabies in L.C.C. schoolchildren fell from a very high level in 1919 to a low one in 1926, and then rose again, slowly at first and later more rapidly, until in 1938 the numbers were practically the same as in 1919. This swinging of the incidence reminds one of similar cycles in the intensity and virulence of certain zymotic diseases and may have a similar biological origin. It must not be forgotten, however, that in the lean years many students and nurses graduate without ever seeing a case of scabies; unfamiliar with the physical signs, they fail to diagnose the disease when they see it, and the possibility of its presence does not enter their minds, so control of the early isolated case is lost and the chances of dissemination are increased.

SCABIES

The itch-mite, *Sarcoptes scabiei* var. *hominis*, has long been known to cause human scabies, but two world wars, with a concomitant enormous increase in the incidence of this disease, have been needed to stimulate full investigation of its *modus operandi*. The adult female is the largest form and so the one most often seen, as she is about 1/60 in. (0.4 mm.) long and just visible to the naked eye when extracted from her burrow. During the 1914–18 war Munro demonstrated that an adult female mite placed on the skin showed a decided preference for certain sites, and that if placed elsewhere on the body she would migrate to one of these areas before settling down to carry on her life cycle. At a site of election she bites and tears a way into the horny layer and then burrows horizontally in it at a rate not exceeding 5 mm. a day. She also lays two or three eggs daily, and may in favourable circumstances carry on in this way for a couple of months. The eggs hatch in three to four days to larvae, which migrate to hair follicles for further development; the larvae moult to nymphs and these to adult males or immature females. From the egg to the egg-laying stage lasts about a fortnight.

Signs and Symptoms

After infestation has taken place there is a variable period without symptoms which is followed by the chief and the most characteristic symptom, itching that is worse at night and usually severe enough to keep the patient awake and scratching. This is a time when the skin is warmest and the cold-blooded mite consequently most active. Those patients who work on night shifts itch more during the day. Dr. Kenneth Mellanby, who intensively investigated the problems of scabies during the last war, believes itching to be a manifestation of sensitization.

By the time a sufferer from scabies is driven by his complaint to seek advice, a secondary polymorphous rash is usually widespread over the trunk and limbs, and vesicles, pustules, wheals, small patches of eczema, impetiginous and ecthymatous crusts, follicular papules, pustules, and boils are obvious when the patient is stripped for examination. Despite the severe irritation linear excoriations are not common. A history of nocturnal itching or the special intensity of the rash in certain areas should arouse suspicions of scabies and lead to a closer search for the diagnostic lesion, the burrow, in the sites of election. These are the sides and webs of the fingers, the front and ulnar aspects of the wrist, the point of the elbow, the anterior axillary fold, the umbilical margin, the buttocks, knees, and over the tendo Achillis. In males they are also common on the glans and shaft of the penis, and in women around the nipples. Infants and young children often have numerous and large burrows on the palms and soles. The face is unaffected except in nursing infants in whom there has been a spread from the maternal breast.

The burrow itself is a thin very slightly raised irregular line seldom more than ¼ in. (1.3 cm.) long. The epidermis at the point of entry is slightly frayed, with the free edges often a little dirty. Where washing has been irregular a burrow may look like a piece of fine black cotton in the skin, but in those who bath frequently and rub away the tops of their burrows the lesions are often difficult to identify. If in doubt put a small blob of ink over the suspected area and wipe off immediately, when a burrow will show as a dark line. The far end of a burrow usually has a distinctive termination: a whitish spot—the mite itself, a vesicle, or a pustule. Where the horny layer is very thin, as on the penis, umbilicus, or anterior axillary fold, the burrows are usually obliterated in a surrounding inflammatory reaction and the characteristic lesions are oval or sausage-shaped pink papules.

When burrows have been identified the diagnosis can be confirmed by microscopical examination. The parasite is extracted either with a triangular needle or by slicing off the blind end of the burrow with a razor blade and mounting the cutting; either method needs practice to do with ease and certainty.

Papular urticaria in small children is often mistaken for scabies, particularly because it is often more itchy when the child goes to bed. The lesions, however, are all variants of a primary small urticarial spot that rapidly develops a central vesicle which may be secondarily scratched, crusted, and perhaps impetiginized. In adults the itchy condition most often wrongly diagnosed and treated as scabies is the milder form of dermatitis herpetiformis, better described by its alternative name—painful polymorphous dermatitis of Duhring-Brocq. In the cases that are usually mistaken for scabies the polymorphy of the lesions varies rather from one attack to another than from a variety of simultaneous ones.

Unusual Forms of Scabies

Despite the high reproductive powers of sarcoptes the average number of adult mites on any patient with scabies is small. Perhaps the heavy mortality rate results from rubbing and scratching to allay itching, for when infestation occurs in someone who by reason of paralysis is unable to scratch or who is insensitive to irritation from some lesion of the sensory nervous system—for example, neural leprosy—or from mental deficiency, there is sometimes an enormous increase in the mite population, which, perhaps due to overcrowding, spreads beyond its usual habitat and may even be found living beneath the free edge of the nails. The skin itself is often covered with patches and large sheets of thick dry mortar-like crusts. This rare form, known as Norwegian or crusted scabies, is likely to remain undiagnosed until those in contact with the patient show the ordinary manifestations of scabies.

Mites that are related to those of human scabies are prevalent in animals, in which they are a cause of mange, and may be transmitted to man and set up irritation. Animal scabies is caught most often from the dog, but those who come into close association with other animals may also be affected—for example, veterinary surgeons, or those who groom horses or camels. On their new host the mites will live but practically never form true burrows or reproduce themselves, so unless the infestation is reinforced from the original sources it will die out in a few weeks. Direct transmission from man to man seems not to happen, and when several members of a household are affected they acquire infestation from the animal. In general practice animal scabies is most likely to turn up in those who fondle pet dogs and present themselves with small urticarial wheals and itchy papules on the face, neck, and forearms. According to Whitfield the point of the elbow is the most likely spot for lesions to be found.

Treatment

The aim of treatment in scabies is to apply some substance that will be effectively lethal both to the various stages of the mites and to the eggs, or, if the action is only on the breeding forms, it should be effective until the eggs have hatched—fortunately, not a long period. Until the last war sulphur ointment and Marcussen's ointment (containing polysulphides) were the most widely used cures for scabies and were most effective when correctly applied. Even so they provoked some degree of reaction (sulphur dermatitis) in a small proportion of cases, and when applied in haphazard fashion or for too long a period the complications were more frequent and less amenable to treatment. These drawbacks made sulphur therapy unsuitable for infants and small children, for whom an ointment containing balsam of Peru had been used empirically and successfully for many years. It occurred to Neilsen about 1912 and Kissmeyer 20 years later to investigate the properties of the balsam, and it was found that the most active constituent against the mite was benzyl benzoate. The later synthetic production of this substance in large quantities has revolutionized the treatment of scabies in the last decade. The early mode of application was in a soapy alcoholic solution, but now an oil-in-water emulsion has been found to be equally effective and also cheaper.

The method of treatment is as follows. A preliminary bath with soap and water is preferable but is not an essential prelude to parasiticidal applications. Scrubbing has also been shown to be unnecessary. Bathing will remove dirt from those who have not bothered to do so and will soften and wash away crusts of any secondary pyodermia. No matter how extensive this may be, treat the scabies first and the infection later. After thorough drying in a warm room the patient is painted—this is preferable to painting himself—from the neck to the toes with applicatio benzylis benzoatis *B.P.C.* on a flat brush, and the emulsion allowed to dry on. If the operator is capable and experienced a single application should suffice, but the inexpert should be advised to apply a second coat to lessen the chance of any spot being missed. When the skin is dry the patient dresses and should not wash again for 24 hours. Underclothes and bed linen should be washed, but it is unnecessary to send blankets, bedding, and clothes to a disinfecting station, as the chance of reinfestation from them is negligible.

Sometimes a patient may still complain of itching at the end of 24 hours' treatment. This should never be regarded as a persistence in the infestation, and emulsion should not be reapplied within a week. The persistence of itching after treatment may be a reaction to the benzyl benzoate or to another constituent of the application, but it is more likely to be due to the eczematous rash that often accompanies scabies. Avoidance of soap and the exhibition of 1% liquid phenol in lotio calaminae oleosa *B.P.C.* will usually allay the irritation within a few days.

Before recommending a further course of benzyl benzoate treatment for continued itching, the possibility of a faulty diagnosis in the first instance should be considered. If burrows and mites had been found originally, a persistence of infestation is due either to inefficient application of the remedy or to insufficient inspection of the household. When scabies occurs all close contacts should be examined, and if the patient shares a bed the other person should be treated *at the same time*, even though he does not complain of itching or show obvious signs of scabies.

Secondary pyogenic infection in scabies ranges from trivial to severe degrees, and may be associated with moist eczematous areas which should be a warning sign against any treatment with strong or irritating germicides. Where there is extensive sepsis begin treatment, after the 24 hours' application of benzyl benzoate, with a warm permanganate bath. Do not add crystals to the bath water; some may not dissolve, and if the patient sits on them his skin will be burnt. A better way is to add ½ oz. (14 ml.) of a 4% solution to each gallon (4.5 litres) of bath water. After soaking for a few minutes crusts and debris are gently wiped off with swabs and then the patient can remain in the bath for a quarter of an hour. Such a bath will benefit most eczematous patches. After the patient has been patted—not rubbed—dry with warm towels, a mildly antiseptic lotion should be applied to the affected areas. Lotio calaminae *B.P.* may suffice. If a more rapid antiseptic action is thought to be necessary acriflavine can be added to make a concentration of 1/1,000 (I have found the other dyes less satisfactory), or to 20 oz. (570 ml.) of lotion add 10 minims (0.6 ml.) of "monsol," a tar derivative with both antiseptic and antipruritic properties which is particularly useful for infected eczematous areas. For severe cases it may be necessary to resort to an antiseptic bath for several days. Permanganate stains on the bath can easily be decolorized with hydrogen peroxide. Sulphonamides should not be used as local applications, but if the regional glands are enlarged and tender they can be given internally. As *Staphylococcus aureus* is usually the preponderating organism sulphathiazole is perhaps the most useful one. It should not be given for more than four or five days, and to avoid sensitization rashes the dose should be kept low—1 g. three times a day is usually adequate.

Mild septic lesions or the later stages of severe ones can be treated with pasta hydrargyri oxidi flavi *N.F.* or 10 minims (0.6 ml.) of monsol and 1 oz. (28 g.) pasta zinci oxidi cum acido salicylico *B.P.C.* (Lassar's paste).

Mellanby investigated the efficiency of other applications for scabies and found that only unguentum sulphuris *B.P.*, Marcussen's ointment, and dimethyldiphenylene disulphide were as effective as benzyl benzoate. The first two have the disadvantage of messiness and the last is more expensive.

Sulphur powder, sodium thiosulphate, derris root and its extracts, pyrethrum, and sulphur internally or in soap are less efficient agents in the treatment of scabies and should be forgotten. A newer compound, tetraethylthiuram

monosulphide ("tetmosol"), incorporated in soap will cure most persons in a few weeks and will certainly prevent scabies spreading in a closed community, so it may be a very useful adjunct in an epidemic.

LICE

Three types of louse infest man and man only—the head louse, *Pediculus capitis*; the body louse, *Pediculus corporis*; and the crab louse, *Pediculus pubis*. The last differs somewhat in shape and is more rotund than the others: a specialist, it leads a more circumscribed life and seldom wanders, though occasionally it strays from its special field up to the armpits and even to the eyelashes; its incidence is never high, and epidemics of it are unknown.

Lice multiply by laying eggs or nits, which are usually attached very firmly to the side of a hair low down near the surface of the skin. At the temperature of the skin the eggs hatch into larvae in about nine days, and the larvae take about the same time to become adults, which may survive for a month. From 8 to 10 eggs a day are laid. Despite the large number of eggs laid the average infested scalp harbours fewer than 10 lice. The heavier the crop of hair the more likely is it to be more often and more heavily infested—hence the higher incidence in females. Infestation is also commoner in children than in adults.

Pediculosis capitis is prevalent in schoolchildren. During the war the affection spread more widely and was not uncommon in young women, not only because of less time being available for attending to the toilet of the hair but also because of an unwillingness to disturb a permanent wave by brushing, combing, and washing.

As lice puncture the skin to feed on blood their bites irritate; this leads to scratching, and usually to secondary pyogenic infection of the skin. An impetigo of the scalp or adjacent area should arouse suspicion of pediculosis capitis, and a search should be made for nits, which are much easier to find than a louse crawling over the scalp. If the infection has been present for some time the adherent nits or the empty shells will have been carried upwards by growth of the hairs and be obvious to the naked eye without unduly close inspection. When infestation is light the most likely place to find nits is on the hairs behind the ears. They are easily distinguishable from bits of scale by being immovably fixed to one side of a hair.

The body louse has adapted itself to the diminished hairiness of the human body by living in the clothing and migrating to the skin to feed. Its eggs can be found attached to lanugo hairs, but more will be found on the clothing, particularly in the seams, which should be carefully examined in suspected cases. Linear excoriations across the shoulder blades are a characteristic sign of pediculosis corporis. Such marks may also be seen in senile pruritus. Some old people wear a garment next the skin for a week or two without taking it off at night for fear of getting a chill. This habit favours the proliferation of body lice, but the infestation can be missed, as clean underclothing is often put on just before a visit to the doctor.

The symptoms of crab lice arise from the irritation set up by the bites, which in the paler skins of some patients show up as bluish grey macules. Occasionally itching is very slight and the infestation is only detected on a routine examination such as the Army inspection for freedom from infestation. What usually brings the patient to seek advice is that rubbing and scratching often sets going in the pubic area a secondary eczema that rapidly becomes moist and crusted, matting the pubic hairs. Such an appearance makes a careful search for evidence of the parasite imperative. The nits are rather darker than those seen in the scalp and sit close to the surface of the skin. If no definite evidence is found on the male pubis examine the perianal region, where the sparser distribution of hairs makes both the louse and its eggs easier to see.

Apart from carrying typhus, a severe infestation of lice will occasionally cause fever, anorexia, and an eruption of macules and papules scattered mainly over the trunk.

Treatment

A great advance in the prevention and treatment of lousiness was also made during the last war, and the newer types of applications have made the task of delousing a population much easier for public health authorities. Mass treatment of the inhabitants of Naples with a powder containing 10% D.D.T. blown under their clothes rapidly brought to an end an epidemic of lice and typhus in 1944. Applicatio dicophani *B.P.C.*, the official preparation containing D.D.T., can be used for all types of pediculosis. About ½ oz. (14 ml.) of this emulsion well rubbed into the hair and scalp and left for 24 hours before washing out will kill the lice there. It has no direct action on the nits, but D.D.T. remains adsorbed on the hair and egg shell to kill larvae when newly hatched. Benzyl benzoate emulsion has a similar action and the further advantage of loosening the cement that binds the nits to the hair, so enabling them to be combed out easily after the hair has been washed. "Lethane" has a similar action to D.D.T. but does not persist quite so long in the hair after washing out, and, as some eggs may take nine days to hatch, a second application may be needed about a week after the first.

Pediculosis pubis can be treated in the same manner as the scalp. Shaving off the hair before treatment is quite unnecessary.

In severe pediculosis corporis, in addition to treating the body, disinfestation of clothes and blankets may be required. A simple method of dealing with a few articles is to go over them with the domestic hot iron, paying particular attention to seams and folds, the most likely places for eggs to be laid.

The treatment of secondary infection in pediculosis is on the same lines as for scabies, except that for hairy regions ointment bases should be soft—for example, unguentum hydrargyri ammoniati dilutum is preferable to a paste unless the hair has been cut close to the skin.

Next Refresher Course Article.—"Acute Osteomyelitis and Septic Arthritis," by Mr. Norman Capener.

Refresher Course Book.—The first 55 articles of this series (fully revised) are available as a book, price 25s. including postage, from the Publishing Manager, B.M.A. House, Tavistock Square, London, W.C.1.

The third seminar for European sanitary engineers was held in London from October 27 to November 1, sponsored jointly by the World Health Organization and the Rockefeller Foundation. The main topic of discussion was the provision of sewage facilities for small communities. Dr. J. A. Scott discussed the health considerations involved in the effective disposal of sewage and the importance of avoiding both water and land contamination. Lieutenant-Colonel Hill and Mr. G. Lloyd Ackers (England) spoke about the principles of design for small domestic sewage works, and Mr. A. E. J. Pettet and Mr. E. E. Jones described the behaviour of five small experimental sewage plants in this country. Professor Meinck (Germany), Professor Leclerc and his colleagues (Belgium), Mr. Walter Dardel (Switzerland), and Mr. Allen and Miss Hazel Smith (England) discussed other aspects of the subject. The provision of proper sewage facilities is a subject still of great importance in many countries, including those in Europe, for methods of disposal and treatment are often inadequate, especially among small communities.

Nova et Vetera

ANCIENT EGYPTIAN MEDICINE

The Old Egyptian Medical Papyri. By Chauncey D. Leake. (Pp. 108. $2.) Lawrence, Kansas: University of Kansas Press. 1952.

The Egyptian medical literature is the Cinderella of medical history. The reasons for its neglect seem to me to be two. First, the contents of ancient Egyptian medical papyri do not link up very closely with other systems of medicine, and, particularly, not with Greek medicine, which we know, nevertheless, has been influenced by Egyptian medicine. Secondly, we have no complete work of Egyptian medicine and perhaps no document by which it can be fairly judged. Ancient medical systems are known through their remains, which, for Greek medicine, have been preserved because they were valued; but the fragments of Egyptian medicine have survived by accident, not by design. After all, what sort of literature would the ruins of our own civilization probably yield? The excavator would find little of the dignity of the tongue that Shakespeare spoke in the masses of daily trash.

The interpretation of the Egyptian material is approaching completion on the linguistic side, and has, in fact, advanced greatly of late years, as the bibliography of Professor Leake abundantly shows. The medical papyri consist very largely of irrational prescriptions for named symptoms. Professor Leake, a distinguished pharmacologist and acknowledged authority on the history of his subject, is in a good position to aid in interpreting the many drug names. He has also taken pains to gain some knowledge of the language of the papyri and has produced a most useful and readable summary of the subject which has the crowning merits of brevity and clarity. Perhaps the most original and interesting of his chapters are on Egyptian weights and measures. The measurement of drugs seems usually to have been by capacity, even for rare and valuable substances such as myrrh and frankincense. The measure specified is usually a fraction or a multiple of a "mouthful." It is astonishing, as Professor Leake rightly says, that none of the great Egyptologists has been impressed by the practical aspect of the tablespoonful. It is even more astonishing that the point has not been made by a physician that a mouthful—Egyptian *ro*—is, with remarkable constancy, equivalent to a tablespoonful. The simplest of experiments will convince the reader of the truth of this. The following table, drawn up by Leake, is of much interest.

Old Egyptian Volume Doubling System

1 *ro* is a mouthful (tablespoonful)
2 *ro* is a handful (fluid ounce, jiggers)
4 *ro* is two handfuls (jack)
8 *ro* is four handfuls (gill)
16 *ro* is a cupful (two cupped handfuls)
32 *ro* is a jugful (pint, Egyptian *Hnw*)
64 *ro* is a pitcherful (quart)
10 *Hnw* (320 *ro*) was 1 *Hk.t* (amphoraful, or 4.5–4.8 litres)

"The remarkable persistence of this volume-doubling system is apparent in old English measures, which go on: two quarts is a pottle; two pottles is a gallon; two gallons is a peck; two pecks is a pail; two pails is a bushel; two bushels is a strike; two strikes is a coomb; two coombs is a barrel; two barrels is a hogshead; two hogsheads is a pipe; and two pipes is a tun."

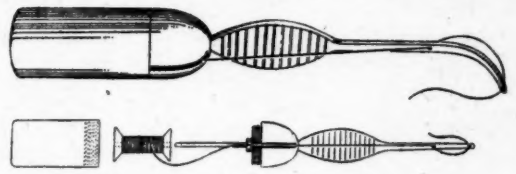
A curious element in Egyptian medicine is the attitude to pus. There are certain prescriptions "to bring forth pus." The Egyptian physicians seem to have realized that the elimination of pus is essential for healing, and to have regarded retained pus as a blood disease, pyaemia in fact. But the rational elements in Egyptian medicine are not very prominent. That system, like most medical systems—including perhaps our own, at any rate till of late—was a mixture of rational, traditional, and purely magical elements. It is the rational elements which Professor Leake stresses, but he has produced a balanced picture of the system as a whole.

CHARLES SINGER.

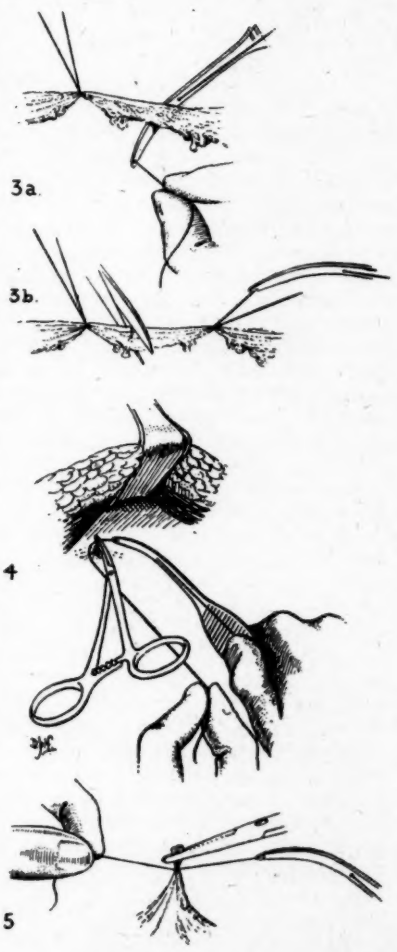
Preparations and Appliances

A CONTINUOUS-FEED ANEURYSM NEEDLE

Mr. D. J. TIBBS, F.R.C.S., first assistant, Department of Surgery, King's College, University of Durham, writes: In principle the device illustrated here is simply an aneurysm needle mounted on a handle containing a spool of thread (Figs. 1 and 2), so that the "needle" can be used repeatedly



without rethreading or leaving the operator's hands. It has been found of great value when a number of long easily surrounded vessels are to be tied—for example, during gastrectomies and colectomies. Here by the "aneurysm needle technique" a number of vessels are swiftly tied without the use of artery forceps; for instance, all the gastro-epiploic branches and short gastric vessels may be tied in one sequence by passing the thread under them, double ligation, and division between the ligatures (Figs. 3a and 3b).



The other great use is found in the facility with which a series of artery forceps in a cavity may be tied off. Deeply placed forceps can have the thread introduced over their points accurately and easily, leaving the aneurysm needle ready primed for immediate use on the next one. A series of deep ligatures present no difficulty and can be tied with a smooth repetitive action of the aneurysm needle. In this respect the instrument has been particularly useful in pelvic, upper abdominal, and thoracic operations (Fig. 4). Routine tying of every description can be performed, the instrument being used in the same manner as the "egg" type of spool carrier (Fig. 5 illustrates this use).

The material usually used on the spool is 60-gauge thread, but alternative spools may be substituted with little delay.

The prototype of this instrument was made by Mr. G. Leslie, technician in the Department of Surgery, King's College, Newcastle-upon-Tyne, and the illustrations were prepared by Mr. D. P. Hammersley, medical artist in the Department of Surgery, to whom I am indebted for their precision and skill.

Reports of Societies

ARE MEDICAL ADVANCES WORTH WHILE?

The proposition, "That the continued advance in medicine will produce more problems than it solves," which was carried (by 59 votes to 47) after the Hunterian Society's debate at Apothecaries' Hall on November 17, appears on the face of it a very simple one, but the delightfully discursive speeches of the four openers, two medical and two lay, who discussed the subject from the cosmic, the political, and the sociological points of view hardly seemed to get down to the real issue. It remained for a speaker in the general discussion to clinch the matter. He said that he had completely recovered from a disease which 20 years ago would inevitably have been fatal. "One thing I know, that, whereas I was blind, now I see."

The Testers Tested

Dr. FFRANGCON ROBERTS, who opened the debate, declared that every new field explored by science opened up fields more complicated still. Any investigator who admitted that he had solved his problem and there was nothing more to be done would very soon be "fired." Even in the mental sphere medical statisticians were arising who tested our intellectual honesty, and they were followed by a breed of psychiatrists who inquired into the mental processes of the statisticians to see whether they were sound or not, and these again by other statisticians, who inquired into the conclusions of the psychiatrists, and so *ad infinitum*. Dr. Roberts painted an amusing picture of the mausoleum of hospital records which would be accumulated in a vast Somerset House on the South Bank, stretching from Waterloo to Greenwich, and the glorious time that statisticians would have 300 years hence with the records of 10 generations. He was wholly in favour of the proposition.

Mr. RITCHIE CALDER was on the same side. He began with the remark that until about 1935 medicine in this country was in the hands of "witch doctors," by which he meant physicians who treated symptoms rather than causes, gave sedatives or stimulants as the case might be, and had about five specifics, such as digitalis as a cardiant, quinine for malaria, and mercury for syphilis, most of them coming down from ancient times. But about 1935 the sulphonamides were developed and penicillin followed. He spoke in particular of the problems in under-developed countries which followed the control of malaria and other diseases. Population had increased, life was lengthened, disease eradicated, but these results brought new types of social and educational problems to baffle the resources of the administrators.

Older but Fitter

On the other side Mr. JAMES GRIFFITHS, M.P., the former Colonial Secretary, argued heavily against the proposition. He took as an example the change in age distribution of the population which had been brought home to him when he was Minister of National Insurance. In 1947 for every person over 65 (pensionable age) there were five persons to support him, and by 1977 there would be only three if present trends continued. But as against this, not only was life prolonged by medical science, but the individual was made more fit, so that in 1951 it was proved that 60% of men who reached pensionable age did not retire but stayed on at work, with corresponding relief to the burden on the State. Mr. Griffiths believed that in 20 years' time statisticians would be able to prove that expenditure on social services was a positive saving to the community on that ground alone. "You go on creating your problems: we [the politicians] will solve them."

The other opponent of the motion was Professor L. P. GARROD, who expressed some amazement on finding himself on the same side as a Labour ex-Minister, for to him the whole idea of the Welfare State was anathema, not only on the ground of cost, but because it destroyed those qualities which had made this country great in the past. This was not entirely a political question. How much money was wasted in the National Health Service on antibiotics? The great medical advances of the last 20 years had been in chemotherapy, and the Ministry of Health had spent fabulous sums on doctors' prescriptions of antibiotics, which were being used for all sorts of purposes, sometimes on the demand of patients who had read about them, and the doctors might be just compliant or might think that they were doing a useful piece of research if they discovered that aureomycin was of any use in the case of pain in the left buttock. In Professor Garrod's opinion the proportion of antibiotics now being prescribed for useful purposes was not more than about one-fifth of the total amount.

Recent medical advance had been successful in dealing with the killing diseases, but not with chronic infections, the sort of things which made life miserable without threatening it to any great extent. In the next 20 years the chronic conditions like sinusitis, the infective forms of arthritis, and so on, might be overcome. Supposing someone did discover exactly how children got bronchiectasis and worked out a means of preventing it, so that there were no longer any bronchiectatic children or adults, would that create a new problem? Not at all. It would simply transform groups of C3 people into A1, and it would solve at least two problems, those concerning schools for handicapped children and occupations for handicapped adults. It was the business of medical science to make life fuller and happier for the people. "If I were entitled in some small degree to call myself a medical scientist," said Professor Garrod, "I think I should feel myself insulted by the terms of the resolution, that the continued advance in medicine produces more problems than it solves."

Neglect of Human Problems

Two remarks in the general discussion may be quoted, the first by Dr. HENRY YELLOWLEES, that medicine is a very human problem, and that it is at present suffering from an enormous growth of technique at the expense of its art. As surely as the scientific side of medicine was developed to excess so did the human problems with which it essentially dealt become more and more neglected. "We have students who are crammed full of every detail of medical technique which recent discoveries have made known, but do not know how to say 'Good morning' to a nervous patient." The other remark, summing up the whole matter, perhaps not with great relevance—but the best part of the discussion was irrelevant—was made by Mr. DICKSON WRIGHT, to the effect that never was it more difficult than now (owing to birth control) to get oneself conceived, but, that obstacle overcome, never was it more easy to become a member of the human race, nor more difficult to leave it.

A job-analysis of mental nursing is being undertaken by Manchester University and Manchester Regional Hospital Board, and a pilot study has started (*Manchester Guardian*, November 11). The task is in the hands of Mr. H. A. Goddard, who has carried out similar work for the Nuffield Provincial Hospitals Trust, and had experience of job-analysis during the war. He has a team of four graduates in social studies working for him, and three hospitals have been selected for detailed investigation—the Lancaster Moor Mental Hospital, the Royal Albert Mental Deficiency Hospital at Lancaster, and the Calderstones Mental Deficiency Hospital at Whalley. The team will study the minute-by-minute details of nursing, how much nursing care is required, how it can be made easier to provide, and how many people are needed to perform the duties satisfactorily. It is hoped from the analysis to make recommendations on the status, working conditions, remuneration, recruitment, and training of mental nurses.

Correspondence

Specialists in Physical Medicine

SIR,—Lord Horder (November 15, p. 1095) makes a plea for additions to the establishment of consultants and registrars in physical medicine. His reasons for this recommendation are based on assumptions from some of the evidence available on the subject. These assumptions will not, I think, be accepted by some who are acquainted with the practical working of physiotherapeutic clinics. It is true that the increase in the last few years of treatment given is of the measure of 75% in most hospitals in the south. I have not seen an analysis of the relevant figures, but I have noticed in my experience with the Metropolitan Police that there is an increasing tendency to prescribe relatively long courses of physiotherapy for men suffering from minor injuries or the secondary effects of early osteoarthritis. Often enough I doubt whether these courses are really necessary or in the best interest of the patient and community. I cannot but think that, certainly for minor injuries, the result is to prolong the period of disability and to encourage an undesirably passive attitude towards the process of recovery.

The following quotation from Lorenz Böhler expresses the idea I have in mind : "The physiotherapeutist (*Medico-mechanik*) should take an honoured place in the service of medicine, but he should be used in the right place at the right time and not be regarded as a universal healer."

It is doubtful if the appointment of more consultants in physical medicine will improve the present state of affairs, for the specialist in any branch tends to magnify the importance of his own subject and to enlarge his department. There are men in charge of the larger clinics with the clinical experience and the attitude of mind which are desirable, but they are a select group. I do not think the method of training suggested in Lord Horder's letter will necessarily reproduce their kind. The possession of the diploma in physical medicine will ensure that a man has an understanding of the various methods of therapy which may be in use, but a great deal more than this is required if he is to form a sound judgment of the value and limitations of these methods for the individual case. I would suggest that, in the small units, economy and efficiency of effort is more likely to be achieved by the closer supervision of treatment by the practitioner primarily responsible for the care and diagnosis of the case.—I am, etc.,

Faversham, Kent. MAX PAGE.

Rubella in Pregnancy

SIR,—In 1940 and subsequently, Gregg, Swan, and others in Australia pointed out the very definite danger to the foetus, leading to deafness, blindness, and sometimes a cardiac lesion, of a rubella infection in the first three months of pregnancy. As an otologist and a member of the Committee of the Deaf Children's Society, I was very perturbed to learn recently from the relative of a deaf child that a general practitioner had questioned the accuracy of the diagnosis of rubella in these reported cases.

If it is thought by many doctors that the infection was not true rubella, and "that other cases have not occurred since," this is a very dangerous as well as an erroneous supposition. There is no doubt whatsoever that children are still being seen with these tragic defects as the result of infection in their mothers by a "simple" illness indistinguishable from typical rubella, often of a very mild nature. Pregnant women should still be extremely careful to avoid contact with rubella—in fact there seems every justification to recommend that all girls should be exposed to rubella before leaving school.—I am, etc.,

London, W.1. IAN G. ROBIN.

Tuberculin Tests

SIR,—Dr. J. D. Lendrum (Sepember 20, p. 649) outlined a practical routine procedure which leads to a rational and quite accurate "jelly method" of testing sensibility to tuberculin. Here in the Province of Quebec those tuberculin tests are made almost entirely in connexion with vaccination by B.C.G. Until recent years the general routine used by the Ministry of Health's "Unités Sanitaires" consisted mainly in the Vollmer's patch test, followed, if proved negative, by an intradermal injection of purified protein derivative (P.P.D.). The negative were vaccinated with B.C.G. scarifications.

In 1950 Frappier and Guy, of the University of Montreal's Institut de Microbiologie et d'Hygiène, published a "New and Practical B.C.G. Skin Test (the B.C.G. Scarification Test) for the Detection of the Total Tuberculous Allergy" (*Canad. J. publ. Hlth*, 41, 72) which is now extensively employed in our country. This test joins the practical usefulness to the impressive accuracy of the reaction. Broadly it consists of a scarification made through one drop of B.C.G. in the concentration of 10 to 25 mg. of B.C.G. per ml. At the same time a scratch is made with a needle only on the opposite side, generally the lumbar region, as a control. The results are observed after 24 hours. The "negatives" show merely the trace of the needle scratch; the "positives" show marked oedema and an intense redness which persists for more than 72 hours. This test enables even a residual allergy (infra-tuberculous allergy) to be detected.

So from a practical point of view it seems that the B.C.G. scarification test is one of the simplest and most accurate reactions for the detection of tuberculous allergy. Furthermore, it makes it possible within 24 hours to choose those who are to receive B.C.G. immediately. One is in favour of, or is against, B.C.G. for active prevention of tuberculosis. But if we are in favour of this vaccine we must use the most sensitive and practical test as time is concerned, and we consider that the B.C.G. scarification test of Frappier and Guy is the best available to-day.—I am, etc.,

Beauport, Quebec. GUY MARCOUX.

Abscess in Femoral Hernial Sac

SIR,—An encysted abscess of a femoral hernial sac resulting from peritonitis due to a perforated appendix is a rare complication. The following case occurred at the Royal Halifax Infirmary.

A woman, aged 75, was admitted to the Infirmary with a history of onset of lower abdominal pain three days previously, with diarrhoea on the day of onset. Her own doctor had diagnosed appendicitis and had been treating her conservatively for it. On the day of admission to the Infirmary her pain had got worse and she had started to vomit. Her bowels had not been open for two days, but she had passed a little flatus on the morning of admission.

On examination, the relative findings were a moist but thickly coated tongue, a tense, tender, irreducible swelling present over the right femoral ring, and some generalized tenderness over the lower abdomen. The general practitioner reported that the hernial swelling had not been present on the previous two days. Nevertheless a diagnosis of strangulated right femoral hernia was made and the patient was operated on under a general anaesthetic.

A right inguinal incision was made and the femoral hernial sac was dissected out and opened. It was found to be full of pus, and the neck of the sac was found closed. This was opened with a finger and pus was seen to pour from within the abdomen. The incision was then extended, and the peritoneum opened. The peritoneal cavity was found to contain purulent fluid and a perforated gangrenous appendix was found and removed. The hernia was repaired and the peritoneal cavity drained.

The patient was treated with intravenous fluids and chemotherapy and made an uneventful recovery. She was discharged home sixteen days after the operation.

Two other similar cases have occurred in this hospital in the last two years. A search of the literature reveals abscesses of the hernial sac to be rare, only a few cases having been described.[1–5] But the fact that three cases have occurred in this hospital in the last two years would suggest

that the condition cannot be as uncommon as the literature suggests and therefore should be kept in mind.

My thanks are due to Mr. H. I. Deitch, consultant surgeon at the Infirmary, for permission to publish this case and help in doing so.—I am, etc.,

Halifax. J. S. MEHTA.

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Treatment of Acute Poliomyelitis

SIR,—There has been some correspondence recently in your columns on whether cases of acute poliomyelitis should be treated in infectious-disease or general hospitals. What is even more important, however, is that the doctors in charge, whoever they are, should make sure that their knowledge is up to date, that the nursing staff are properly trained, and that the best possible equipment is available. For example, the evil reputation of the bulbar type of the disease is still notorious, whereas in fact the prognosis is generally very favourable provided that the "airway" is kept clear for a few days by means of postural drainage in the prone posture. This posture also assists breathing in many cases in which the abdominal muscles are paralysed and coughing is impossible, as it enables the weight of the abdominal viscera to raise the diaphragm during expiration.

The skilled exploitation of postural drainage saves many lives, but the problems involved are probably understood best by chest surgeons, brain surgeons, and anaesthetists, who may with advantage be consulted by any not fully familiar with the nursing methods. In regard to equipment it seems desirable that all units should be equipped with special beds for postural drainage which can be raised in the centre to form an inverted "V." Other equipment, including respirators, suckers, and oximeters, should also be the best on the market.—I am, etc.,

Oxford. W. RITCHIE RUSSELL.

Treatment by Radioactive Tantalum Wire

SIR,—It is not of much importance to establish who did what for the first time. Perhaps you will, however, allow me space to add to Mr. Anthony Green's letter (November 1, p. 994) recording "one of the first cases of malignant disease other than the bladder treated by radioactive tantalum wire," since he has raised the matter.

The first use of radioactive tantalum wire in this country was not for the bladder. Walton and Wallace discussed its use in the form of beads, wire, and foil in 1950.[1] It was used by Dr. M. Lederman for orbital implant, and by Mr. Michael Harmer for implants in the buccal cavity as reported by me at the International Radiological Congress in London in July, 1950.[2] The first report on the use of this material in the bladder was also given in 1951.[3] Mr. Michael Harmer has used tantalum wire for implants of the palate, tongue, buccal mucosa, and skin, and it has also been used at the Royal Cancer Hospital for surface applicators.

It is still too soon to say whether this technique offers material advantages over those previously available. A full account of the use of Ta^{182}, as well as radioactive Au^{198} wire, has been given.[4 5 6]—I am, etc.,

London, S.W.3. D. W. SMITHERS.

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Treatment of Pernicious Anaemia

SIR,—During recent months many articles have been written stressing the value of vitamin B_{12} injections in the treatment of pernicious anaemia. Blackburn *et al.* published an article (August 2, p. 245) stating that they can confidently recommend physicians and general practitioners to change their patients' treatment from liver extract to vitamin B_{12}. They also go on to say that there seems little justification for the continuation of the relatively expensive form of treatment unless better evidence than that now available can be brought forward to suggest it.

During the past four years I have treated over a hundred cases of pernicious anaemia with vitamin B_{12} injections, parenteral liver extract, and proteolysed liver, and from the results I have obtained with these various preparations I am sure that in some patients the injection of the cruder preparations or proteolysed liver have definite advantages over the refined vitamin preparations. I should like to report a case which illustrates the great value of proteolysed liver.

A male patient, aged 40 years, was admitted to hospital on September 26, 1951, suffering from a severe anaemia. Apart from the pallor due to the anaemia the physical examination was negative, but the more specialized investigations revealed severe macrocytic anaemia, with a red-cell count of 1,720,000 per c.mm. and a haemoglobin of 48%. The white-blood-cell count was 2,400 per c.mm., with a normal differential count. When some marrow taken from the sternum was examined many primitive red cells were seen which were maturing into megaloblasts. Many giant band cells were present in the maturation of the white cells. A barium meal was negative. There was a histamine-fast achlorhydria and the serum bilirubin was slightly raised. The red-cell fragility was within normal limits and a direct Coombe's test was negative. A fat-balance test revealed results within normal limits. A barium enema was negative. The liver-function tests were all normal. A diagnosis of pernicious anaemia in relapse was made.

Two ml. of a well-known parenteral liver extract was given at weekly intervals and this produced a reticulocyte count of 39% on the fourth day after commencement of treatment. The red-cell count and haemoglobin concentration gradually returned to normal. The megaloblastic cells in the marrow were changed back to normoblasts. The patient was discharged and kept under constant observation in the follow-up clinic, and after three months his red-cell count and haemoglobin concentration gradually began to fall. The bone marrow became megaloblastic. The parenteral liver extract was changed to another liver extract reputed to be of high concentration. This produced no effect on the red-cell count, the haemoglobin concentration, or the marrow pictures. After a month on this treatment, vitamin B_{12} was given parenterally in doses of 50 μg. weekly, and this failed to influence the relapse. He was readmitted to hospital and a clinical state similar to the one already described was discovered. The special investigations were repeated with the same results.

A diagnosis of pernicious anaemia in relapse refractory to parenteral liver extract and vitamin B_{12} injections was made. 30 g. of a well-known proteolysed liver preparation was given daily and this produced a reticulocyte response of 20.4% within seven days of commencement of this treatment. Within two days the marrow had reverted to a normoblastic picture and the red-cell count and haemoglobin concentration gradually returned to normal. Since then he has remained well with this treatment.

This must have been a case of pernicious anaemia, as special investigations ruled out the other causes of megaloblastic anaemia, such as neoplasms of stomach, idiopathic steatorrhoea, and liver disease. A diagnosis of a severe haemolytic condition associated with a megaloblastic anaemia count could not be supported by a normal red-cell fragility and a negative direct Coombe's test, so that improvement in the blood count could not be attributed to regeneration of the haemopoietic system after a haemolytic episode. Without treatment with proteolysed liver the patient would have died.

Proteolysed liver is also useful in the treatment of pernicious anaemia in pregnancy and in those remoter parts of of the country where injections are difficult to give and laboratory control of the anaemia impossible. When injections of liver and vitamin B_{12} have failed to maintain the blood count satisfactorily, I have on six occasions substituted proteolysed liver, with an immediate return of the blood count to normal. I am convinced that there is a place for all three of these preparations in the routine control of pernicious anaemia.—I am, etc.,

Birmingham, 18. R. O. GILLHESPY.

Operative Method of Thrombosing Varicose Veins

SIR,—It is not clear why Mr. A. Johnston Abraham (August 2, p. 260) and Mr. F. D. Murphy (September 27, p. 725) do not just extract the veins when the Babcock's extractor probe (not his original vein-stripper) has been

positioned. Failure is only likely when the saphena is duplicated. Making the probe elastic, as Murphy suggests, would help, especially when it is passed from below upwards, as the late Sir Henry Gray, who introduced the method into Britain, often did. The results of extraction were excellent in 20 soldiers traced five years after operation (*Brit. J. Surg.*, 1921, 8, 486), but subsequent experience has shown that they are perhaps not so good in civilians.

The danger of deep thrombosis being caused by overflow into the deep veins, given as a possible reason for the newer method, must be rare in the absence of previous white leg, in which case any treatment other than Unna's semi-rigid method, used hydrostatically over a long period, seems to be contraindicated. The use of the larger salicylate and other injections, which often produced severe cellulitis, is largely in abeyance. The smaller quinine injection seems to carry no such risk, as the deep vein dilution is large and sudden, and the results are uniform and very good. A disadvantage is that the solution is not guidable by the pain it produces. It was shown (*British Medical Journal*, 1929, 2, 848) that solutions which produced delayed pain after injection could be easily guided into any desired area affected with varicosity. Until someone with suitable material adjusts the percentage of urethane so as to produce only slight pain on injection we shall have to continue with the more haphazard method and hope that previous ligatures will not direct too large a quantity of the solution into the deep veins.—I am, etc.,

London, W 1. G. H. COLT.

Blood Changes and Diagnosis of Infectious Mononucleosis

SIR,—In their article on "Infectious Mononucleosis With Thrombocytopenic Purpura" (November 1, p. 977), Drs. C. M. Ogilvie and T. E. Parry suggest that patients presenting with purpura should have a Paul–Bunnell reaction carried out to exclude the possibility of infectious mononucleosis.

The only point with which we disagree is their obvious reliance on the Paul–Bunnell test for confirmation of the diagnosis. It has been our experience and that of others (Fuller, 1941[1]; Paul, 1941[2]; Vander Meer *et al.*, 1945[3]; Warren, 1941[4]; and Kaufman, 1944[5]) that cases commonly occur which are clinically and haematologically indistinguishable from infectious mononucleosis, but in which the Paul–Bunnell test is consistently negative. Moreover, in many cases the Paul–Bunnell test does not become positive until well after the clinical condition has subsided. Kaufman records many instances in which the heterophile antibodies did not appear until periods ranging from two to six months after recovery. However, in all cases of infectious mononucleosis the abnormal lymphocytes characteristic of the disease are invariably present, even in the absence of an absolute or relative lymphocytosis. We feel, therefore, that the blood changes are more important as an aid to diagnosis than the Paul–Bunnell test, although, of course, the finding of a positive Paul–Bunnell test would be further evidence in support of the diagnosis. We are at present investigating the association of mononucleosis with the Paul–Bunnell reaction, and this will be the subject of a future communication.—We are, etc.,

J. G. COLLEE.
S. SHUBERT.

Newcastle-upon-Tyne.

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Acquired Sensitivity to Streptomycin and P.A.S.

SIR,—Three cases have recently been described of acquired sensitivity to streptomycin and P.A.S.[1 2 3] One of these[1] was characterized by exfoliative dermatitis. The following case in which there was also exfoliative dermatitis seems worth recording.

The patient, a female aged 27 years, was receiving out-patient treatment with streptomycin (1 g. daily) and sodium P.A.S. (12 g. daily) for tuberculous endometritis. In the third week of treatment she began to suffer from sickness which persisted despite the fact that the P.A.S. was administered in different forms. On the evening of the 22nd day of treatment she had a severe rigor, and on the following day she became hot and flushed and developed on the trunk an erythematous eruption with large urticarial patches. There was intense pruritus. The rash spread to involve almost the entire body. There was well-marked oedema of the lower limbs and face, the latter resulting in closure of the eyes. The patient was extremely ill. There was no jaundice. P.A.S. and streptomycin were discontinued. Subcutaneous adrenaline produced only slight relief of symptoms and large doses of an antihistaminic drug, phenindamine hydrogen tartrate ("thephorin"), were given. Gradually the temperature returned to normal, and the oedema, urticaria, and pruritus disappeared. On the seventh day of illness the skin of the eyelids began to desquamate, and in the following two weeks the skin of the greater part of the body was shed, often in quite large plaques. The entire illness lasted for three weeks.

It was considered at that time that sensitivity to P.A.S. rather than to streptomycin was likely to have caused the illness, and this diagnosis appeared to be confirmed when, after the acute phase of the illness, a skin patch test with a 20% P.A.S. solution gave a strongly positive reaction. It was decided to continue treatment with streptomycin alone, but after one other injection (1 g.) a reaction developed similar to the first. The temperature rose, there was intense itching, and a widespread, though faint, erythematous eruption developed. Urticaria was less marked than during the first illness, but desquamation again followed, though not to such an alarming extent as on the first occasion. The most dramatic feature of the second reaction was the fact that the hair of the head began to fall out, depilation progressing to such an extent that the entire scalp and both eyebrows were denuded of hair. Hair was also shed from the extremities. Fortunately within two weeks the hair began to grow again and eventually returned to normal in quantity, texture, and colour.

I wish to thank Dr. A. M. Sutherland, Southern General Hospital, for access to the hospital case-record, and Dr. W. Blair for details of the illness while the patient was at home.—I am, etc.,

Glasgow. R. J. CUTHBERT.

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Arterial Spasm in Limb after Venepuncture

SIR,—Dr. M. Sutton's article on "Arterial Spasm due to an Intravenous Infusion" (October 18, p. 859) and the subsequent correspondence (November 15, p. 1097) make one wonder whether some of the effects of so-called "arterial injection" of thiopentone are not really caused by extravenous injection in the region of the brachial artery in patients whose vascular system is particularly susceptible to irritant solutions.

Recently I examined the forearms of 50 male and 50 female patients to ascertain the incidence of abnormalities of the brachial artery, and the relationship of the superficial veins in the antecubital fossa to the artery. In over 50% of patients the bicipital fascia was apparently poorly developed, and with the arm fully extended the artery was superficial for at least two-thirds of its course through the antecubital fossa. In 30% of males either the median cubital or the median basilic vein lay directly over the artery above the bicipital fascia. These figures suggested to me that in certain circumstances it would not be difficult to transfix the artery, which when the arm is extended is stretched over the supinator muscle, and relatively immobile.

Although on occasion I have inadvertently injected thiopentone subcutaneously in the antecubital fossa, I have never seen vasospasm. In view of what has already been published in these columns it would be interesting to know whether other anaesthetists have seen vasospasm of the brachial artery and its branches after thiopentone has been injected into or around the median cubital or basilic veins.—I am, etc.,

London, S.E.11. D. A. B. HOPKIN.

Day and Night Laboratory Service

SIR,—The danger of immunizing women to Rh by blood transfusion is rightly emphasized again in your annotation (November 1, p. 986). If cases where this has occurred were investigated it would often be found that transfusion had been given in an emergency when the services of trained laboratory technicians for matching the blood were not available.

The provision of a 24-hour laboratory service would often be difficult and expensive, but the establishment of such services is also being obstructed by a regulation of the Ministry of Health that forbids the payment of the telephone rentals of a hospital officer whose salary is over £600 a year. The rule is applied blindly without consideration of the merits of the individual case. I know of a laboratory where a 24-hour cover for the matching of blood could easily be given. The chief technician lives within easy distance of the laboratory and would be willing to come in on his bicycle when required. Unfortunately his salary is £605 a year, and a request that he be put on the telephone at the cost of the hospital, though favourably received by the management committee and the regional board, had to be turned down. Large sums of money are spent annually on the laboratory concerned, and yet a full laboratory service is denied to patients when they are in need of it by this policy of spoiling the ship for a ha'p'orth of tar.—I am, etc.,

Northallerton, Yorks. P. N. COLEMAN.

Infected Anaesthetic Apparatus

SIR,—Dr. P. R. Bromage (November 8, p. 1042) and other writers on this topic have dealt with the machines, their breathing tubes and bags, but it is probable also that there is often grave danger of infection from patient to patient through minor apparatus and instruments—e.g., airways, Magill's tubes and connexions, laryngoscopes, etc.

Though in most operating theatres surgical asepsis is above suspicion, it is often difficult to maintain ordinary standards of domestic cleanliness for the anaesthetist's appliances, and I would endorse fully Dr. Bromage's remarks on slovenly upkeep; it is far too common to find breathing-tubes, etc., decorated with the blood splashes of yesterday's or last week's operations. The top of most anaesthetists' trolleys is usually embellished with a tightly stretched and fixed towel, which may only be changed at long intervals. On this are placed indiscriminately clean instruments awaiting use, and dirty ones perhaps dripping with saliva or mucopus straight from a patient's mouth. For these lapses the doctors must be finally to blame, but they can expect little co-operation from nursing staffs, who are presumably too fully occupied elsewhere.

This situation has sometimes led to the development of anaesthetists' technicians, but it is open to argument whether such subdivision and specialization of operating-theatre personnel is desirable; an alternative would be the better education and training of existing staffs.—I am, etc.,

London, N.W.8. R. J. CLAUSEN.

Recent Advances in Active Immunization

SIR,—I am sorry if Dr. Guy Bousfield (November 22, p. 1152) feels I have done less than justice to Dr. L. B. Holt in my opening paper at the Annual Meeting of the B.M.A. at Dublin (November 8, p. 1010). Holt's well-known work on diphtheria P.T.A.P. was first published in 1947 and hardly comes within the category of "recent advances"; 22 of my 23 references are to articles appearing between 1948 and 1952. P.T.A.P. is still undergoing clinical trials, and I did not wish to anticipate the official report. The paucity of my notice of P.T.A.P. was further conditioned by the compression required to get the facts into the space allotted to openers of discussions. Moreover, Dr. Holt was present at the meeting and himself referred to some of his recent work.

As Dr. Bousfield states, I gave more prominence to A.P.T. than to P.T.A.P., but I used A.P.T. to illustrate immunological data which are also applicable to P.T.A.P. I have referred extensively to P.T.A.P. in my book (*Bacterial and Virus Diseases*, 2nd edition, E. & S. Livingstone, 1951). The discovery and introduction of P.T.A.P. were a useful development in the prevention of diphtheria, and I should be the last person to think otherwise.

Dr. Bousfield's charge that immunologists had sunk into a "slough of complacency" before the advent of Dr. Holt hardly needs comment. It is only necessary to read the scientific publications of my colleagues at the Wellcome Laboratories to realize that the charge is unfounded.—I am, etc.,

The Wellcome Research Laboratories, Beckenham. H. J. PARISH.

The Kingston and Victoria Medical Foundation

SIR,—About a year ago the Kingston and Malden Victoria Medical Foundation addressed an appeal to every practising doctor in the United Kingdom for funds for a new independent voluntary hospital. In so doing the medical members of our committee were inspired by the thought that our effort to right a local wrong was a factor—and a not unimportant one—in the general struggle for the preservation of professional standards that is going on everywhere. The general practitioner is to be congratulated on the very substantial amelioration of his financial lot that he has received under the Danckwerts award. This, however, was not secured without prolonged and energetic efforts on the part of our representatives in the B.M.A. and the determined support of the great body of the practitioners.

May we suggest that *our* effort—an attempt to establish the just place of the general practitioner and the general-practitioner hospital in the health service of the future—is also worthy of general support? In this case there is no financial issue at stake, but there *is* the whole question of the future status and function of the general practitioner *vis-à-vis* the hospital service, and this may affect his future happiness, and the value of his work, to a degree second only to the question of a fair rate of remuneration. The response of the medical profession and of the general public to our appeal last year was not ungenerous; but we still need several thousand pounds before we can acquire and convert a building for the new hospital. In view of the professional aspects of our struggle, may we once again ask the medical profession as a whole to rally to our support and help to make the new hospital a working reality at an early date?—I am, etc.,

Kingston-on-Thames. F. B. LAKE, Chairman, Kingston and Malden Victoria Medical Foundation.

Safety-belts

SIR,—Professor Eugene F. DuBois's article "Safety-belts Are Not Dangerous" (September 27, p. 685) is very interesting, but is likely to lead to erroneous opinions concerning the pathological findings of Dr. R. D. Teare.

As the coroner who held the 28 inquests on the deaths that arose from this Viking crash, I wish to make it quite clear that Dr. Teare did not, either in his pathological reports to me or in his evidence at the inquests, state that safety-belts were dangerous or that they had *directly* caused injury in the victims of this crash. Dr. Teare's evidence was: (1) That the immediate cause of death in more than half of the victims was acute flexion of the body over the safety-belt. (2) That in each of these persons the body had been held at the hips by the belt, and when the crash occurred the body and legs had pivoted at the hips, performing the movement usually described as "jack-knife." (3) That the injuries which caused death in these cases arose as a result of this forward "jack-knife" movement.

Dr. DuBois clearly recognizes that "jack-knife" movement occurs in such circumstances, but denies that the injuries described by Dr. Teare and attributed by him to

this movement are in fact caused by the movement. This is a matter of scientific opinion on which I express no view.

I would point out that in this air crash, as in all others occurring within my jurisdiction, every death was investigated by a complete and detailed post-mortem examination, as it is only by such an examination that the real cause of death can be established and the error of attributing death to some obvious external injury avoided. Am I right in assuming that *all* the cases on which Dr. DuBois bases his opinion were similarly examined?

I am sending a copy of this letter to Dr. DuBois, as I am sure that he and his colleagues in the U.S.A. are keenly interested, as are investigators in this country, in assessing all possible evidence in the hope of lessening the number of air crashes and of lowering the mortality in those that do occur.—I am, etc.,

HAROLD G. BROADBRIDGE,
H.M. Coroner, County of Middlesex, Western District.

Breathing during Deep-diving

SIR,—I feel that there should be a more complete ending to the unfinished business mentioned in the late Dr. Millais Culpin's article (November 1, p. 955). I am not writing to win a point in a debate which can only be one-sided, but feel that a few facts should be placed on record.

There is no mention in this article of the fact that the psychological explanation of the breakdown of men breathing air at great depths has now been abandoned by all authorities. Shortly after the investigation described, Behnke discovered that the highly abnormal sensations and behaviour encountered under these conditions could be completely relieved by the breathing of mixtures in which the nitrogen was replaced by lighter, physiologically inert gases such as helium. Similarly these symptoms could be reproduced at much lower pressures if a heavier inert gas such as argon was substituted for nitrogen. All diving to great depths is now carried out using helium and oxygen mixtures. The divers behave perfectly normally, yet the physical dangers and risk of bends are as great with helium mixtures as with air. Further, it has now been shown that men undergoing excessively rapid compression to great depths are unable to ventilate their lungs properly, as up to 45 litres (measured at 1 atmosphere) of air will enter the lungs in a minute or less during very rapid descent. The inevitable temporary retention of carbon dioxide with added nitrogen intoxication causes a transient but intense sensation of being anaesthetized. One of the divers mentioned in the article described this sensation with great accuracy: "I felt dizzy at 40 fathoms and at 45 felt in a nightmare. Felt like going under ether—that made me think of going unconscious." In my own experience many men who were divers, and took an active and successful part in underwater warfare, suffered from fear of the darkness and the depths. Their courage and self-control under these hazardous conditions roused the greatest admiration. No group of men can be neatly divided into those near breakdown and those composed of cast iron. Human beings are not like that. In the cases mentioned by Culpin it is certain that the reaction to carbon-dioxide retention and nitrogen intoxication would be most marked in those who were fighting claustrophobia and loss of confidence.

Culpin also stated that the breathing of oxygen instead of air at high pressures "made no difference to the problem." I do not think that he ever saw men convulse with oxygen poisoning, but I feel sure that he would have been convinced if he had seen animals resting quietly in 6 atmospheres of air, and then twitching and convulsing to death when this was substituted by oxygen. This has none of the subtleties of shellshock or disordered action of the heart; oxygen under these conditions kills, and kills more certainly and quickly than arsenic.

Finally, may I close this letter by paying tribute to a "grand old man" of medicine who was so often right, but, I think, in this case was wrong.—I am, etc.,

Birmingham, 15. K. W. DONALD.

Dupuytren's Contracture Treated with Vitamin E

SIR,—Dr. R. J. de Carteret in his letter (October 25, p. 939) regarding my article (June 21, p. 1328) on Dupuytren's contracture refers to my conclusions as "this hurried opinion." In my article I stressed that all patients had been given vitamin E for a minimum period of three months, in fact some had had vitamin E for one year. It was also used as the sole form of treatment and every effort was made in estimating the deformity to exclude any human error.

Dr. de Carteret refers to his first patient but to no others. In my article I also stressed that pain, tenderness, and swelling in the palmar fascia could disappear without any form of treatment. Thompson (*British Medical Journal*, 1949, **2**, 1382), who reported good results from treatment of Dupuytren's contracture with vitamin E, regarded these symptoms and signs as a favourable response of the condition to treatment with vitamin E, while de Carteret regards the disappearance of these as a favourable sign. We are not told why penicillin was injected locally or at what stage of the treatment it was given.

I feel that Dr. de Carteret has unjustly accused me of a "hurried opinion," and I also wonder whether the condition he is treating is Dupuytren's contracture and whether he himself had doubts about this and used penicillin.—I am, etc.,

Oswestry. H. J. RICHARDS.

POINTS FROM LETTERS

The Pre-registration Year

Dr. R. D. BROOKE WILLIAMS (Rochester, N.Y.) writes: The compulsory pre-registration internship for young doctors which has been accepted, and which starts operating in 1953, is a change in the medical sphere which is worthy of a few moments' consideration. Are the arrangements such that any benefit will be forthcoming to the doctor who would have interned anyhow, apart from the benefit, if any, of an additional obligation? ". . . A successful internship does not depend on the young doctor alone; it depends also on the hospital in which he serves his internship. . . . If the real aim of the compulsory internship is to be achieved the hospital's obligation to the intern can be met to a great extent by observing a number of fair, practical, and reasonable points: (1) the filling of all vacancies for interns in any hospital on a fair competitive merit basis, regardless of whether the applicant hails from London or the provinces; (2) at least five hours per week of instruction by suitably qualified members of the staff, which would include *x*-ray and pathology conferences; (3) credit towards subsequent promotion for good and practical work in the care of patients in the ward; (4) a monthly meeting with a senior member of the medical staff, and representatives of both the administration and nurses; this meeting would improve the team spirit and facilitate discussion of problems arising from everyday work on the ward such as procedures and techniques; it would also give the intern a chance to voice his opinions on improving the efficiency of the institution; (5) a definite association of each intern with a chosen registrar who would act as his friend, guide, and adviser; it would be this registrar's task to brief the new intern and to have sufficient working knowledge of the hospital routine to see that the intern was not overburdened with unnecessary matters. We should try to stave off the danger the intern faces of losing his individuality . . . by giving him a fair training programme and see that he does not become like a bead on an abacus, or our calculation may turn out wrong in practice.

Diet and Stamina

Dr. N. R. DHAR (Allahabad, India) writes: With reference to Dr. A. A. Lewis's letter on "Diet and Stamina" (August 23, p. 445), I have to point out that his statement that "the daily requirement of so-called 'first-class' protein for a human being has been estimated at 60–70 g." is not quite correct. Man is always trying to have more animal proteins in his diet. He is not fond of vegetable proteins. But even the animal protein consumption in highly advanced countries like the United Kingdom, Ireland, France, Holland, Belgium, etc., is less than 60 or 70 g. per day as stated by Dr. Lewis. To-day we may safely fix the total protein requirement of a human being as 1 g. per kg. of the body weight of the person, and half of it must be of animal source. Animal proteins supply the adequate essential amino-acids required for the maintenance of health more easily than vegetable proteins. Hence the consumption of animal proteins for poorer nations must go up.

Obituary

T. E. SAXBY, O.B.E., F.R.F.P.S.

We record with regret the death of Dr. T. E. Saxby at his home at Baltasound, Unst, one of the Shetland Islands, on October 11, at the age of 83. His practice must have been one of the most remote in the British Isles—even visits to Lerwick were special events in his life—but no man could more worthily have upheld the best traditions of medicine.

Thomas Edmondston Saxby was born at Baltasound on March 9, 1869. His father, who was medical officer on Unst before him, was a well-known naturalist, being the author of *The Birds of Shetland*, still a standard work, and his mother was Jessie Margaret Edmondston Saxby, authoress of more than 30 books, many of them about the Shetland Isles. Her father also, Laurence Edmondston, was a doctor on Unst and an eminent scholar, author. and linguist. Thomas Saxby himself said that his family association with the Shetland Isles could be traced back 400 years. He was sent to school at George Watson's College, Edinburgh, and from there he went on to the University of Edinburgh and the Royal College of Surgeons of Edinburgh to study medicine, taking the Scottish triple qualification in 1897. For a time he continued his clinical studies at St. Mary's Hospital, London. In 1898 he returned to the Shetlands and settled in practice at his grandfather's house at Baltasound, where he remained until his death. He retired from active practice in 1950. During that long period he gave unbroken service to the people of Unst and to the crews of the fishing boats which came to Baltasound. When he had completed 50 years of work in 1948 the people of the island subscribed towards a presentation in recognition of his long and faithful services.

Besides his practice Dr. Saxby had many other interests. Like other members of his family he was a naturalist, and himself wrote several books, one of them being entitled *Occurrence of the Hawfinch and Other Birds in Unst*. In his student days he established a meteorological observation station at his home, and for many years kept accurate records which he submitted regularly to the Air Ministry's Meteorological Office in London. For this work the Air Ministry in 1937 presented him with an inscribed barometer. He had an exceptional aptitude for mechanics, and the models he made all showed exquisite workmanship and a beautiful finish. For many years during his life on the island he was chairman of the Unst School Board, president of the working-men's club, chairman of the parish council, and president of the local branch of the British Legion, besides being a justice of the peace. A friend of his has recorded that shortly after qualifying Saxby was offered an appointment as court physician to the then reigning King of Sweden, but he preferred to stick to his decision to carry out his life's work in Unst. In 1911 he was created a Knight of the Royal Order of Vasa by the King of Sweden for his work among the Swedish fishermen who frequented Baltasound. During the 1914–18 war he acted as Admiralty surgeon and was often called out to treat survivors of torpedoed ships. During the last war he was medical officer to R.A.F. and other units stationed on the island, and in 1948 he was appointed O.B.E. In 1917 he was elected F.R.F.P.S. Dr. Saxby's wife predeceased him. He is survived by two daughters and one son.

One who knew him has written: "He did not merely maintain the glory of his gifted dynasty—he added to his laurels and remained truly himself—a man who refused the things of this world in order to serve as few have ever served."

E. W. FAIRFAX, M.B., Ch.M., F.R.A.C.P.

Dr. E. W. Fairfax, well known in Sydney as a physician and philanthropist, died at his home there on October 29.

Edward Wilfred Fairfax was the sixth son of the late Sir James Reading Fairfax and the grandson of Mr. John Fairfax, one of the founders of the *Sydney Morning Herald*, a leading daily newspaper in Australia. He went to school at Bath in this country, and later to Sydney Grammar School, from which he went on to the University of Sydney, graduating M.B., Ch.M. in 1899. After a period of work as resident medical officer at the Royal Prince Albert Hospital he came to England as a postgraduate student and obtained the M.R.C.S., L.R.C.P. in 1901. On his return to Australia he was elected to the honorary medical staff of the Royal Prince Albert Hospital, Sydney, in 1903, being first an assistant physician and later full physician. From 1934 to the time of his death he was an honorary consulting physician to the hospital and was also a member of the board of directors. Among the other hospitals with which he was associated were the St. Vincent's Hospital, the Royal Hospital for Women, and the Prince Henry Hospital. At Sydney University he was a lecturer in clinical medicine from 1912 to 1934, and he was a foundation Fellow of the Royal Australasian College of Physicians. During the first world war Fairfax served with the Australian Army Medical Corps as senior physician to the First Australian General Hospital at Rouen, France, and later, with the rank of colonel, as consulting physician to the British Expeditionary Force in France and Belgium.

Widely respected in medical, business, and philanthropic circles, Dr. Fairfax was closely associated with a number of charitable organizations, among them being the Flying Doctor Service of Australia (New South Wales section) from its inception; at the time of his death he was a vice-president of the Service. He held many offices in the Red Cross Society, being honorary physician to the sanatoria of the New South Wales branch from 1919 to 1924. A member of the Sydney Committee of Dr. Barnardo's Homes from 1934, he was its chairman from 1935 to 1947. He was also president of the New South Wales branch of the Bush Nursing Association, and a director of the Boys' Brigade. He often travelled long distances into the country visiting children from Barnardo's Homes who had been placed in positions, or visiting centres of the Bush Nursing Association and the Broken Hill base of the Flying Doctor Service.

Fairfax was a very sound physician and an excellent clinical teacher, particularly kind and courteous to his patients. He is remembered with gratitude by generations of students, especially for the care with which he initiated them in principles of physical examination. Well aware of the importance of science in medicine, he was responsible for the appointment at the Royal Prince Albert Hospital in 1922 of a science graduate to carry out laboratory tests, this being the beginning of the hospital's biochemistry department.

In a tribute to the memory of Dr. Fairfax, Major-General the Reverend C. A. Osborne spoke of his dislike of show and publicity, and continued: "He fought any meanness and injustice, and encouraged what was

good and worth while." Dr. Fairfax is survived by a wife, a son, and a daughter, to whom we offer our sympathy.

G. T. BURKE, C.I.E., M.D., F.R.C.P.

We record with regret the death of Lieutenant-Colonel G. T. Burke at Bexhill-on-Sea on November 13, at the age of 70.

Gerald Tyler Burke was born on May 31, 1882, the son of the late Lieutenant-Colonel W. H. Burke, of the Army Pay Department. He studied medicine at St. Bartholomew's Hospital, where he won a preliminary science exhibition in 1902 and, later, several scholarships, before graduating M.B., B.S. in 1907. Two years later he joined the Indian Medical Service. During the first world war he served in East Africa, and at the end of hostilities he was posted with troops at Constantinople. During a period of leave in 1922 he proceeded M.D. and took the M.R.C.P. On his return to India Burke was transferred to the civil side of the I.M.S. and posted to the United Provinces. There he was placed in various civil surgeoncies, but he always retained a leaning towards medical education. In 1929 he was appointed professor of medicine in the University of Lucknow after having officiated in that chair on previous occasions. He was elected F.R.C.P. in 1933. He took a great interest in the affairs of the British Medical Association in India, being president of the United Provinces Branch in 1932 and again in 1935, and he attended the Annual Meeting of the B.M.A. as a representative in 1931 and 1934.

Burke was a careful and an accurate physician, a good teacher, and a searching and impartial examiner in his subject. Because of his even temperament and firmness he was popular with both Indians and British. In 1935 he left his professorial post on appointment as secretary to the new Medical Council of India. The council was born only 13 months previously in circumstances of political unrest and diverse opinions on its need and constitution, so that the first year of its young life was difficult. But after Burke took over the secretaryship his painstaking attention to detail and his evident fairness to all sides helped to remove difficulties from the path, and the council grew in strength and influence. For his services with the Medical Council he was created a C.I.E. in 1938, just after his retirement from the I.M.S., and thereafter he served on medical boards at the India Office and later at the Commonwealth Relations Office. Burke was twice married, in each case to a member of the nursing profession. His first wife, whose death saddened the time of his retirement in 1937, had given him a daughter. His second wife and two small sons survive him, and to them goes our sympathy.—C. A. S.

W. C. SILLAR, M.D.

Dr. W. C. Sillar, who was for many years lecturer in experimental pharmacology in the University of Edinburgh, died on October 23 aged 88.

William Cameron Sillar studied medicine at the University of Edinburgh, graduating M.B., C.M. in 1887. He took the B.Sc. (public health) in 1889. After further study on the Continent he settled down in Edinburgh as a teacher in the department of materia medica at the University, where he spent practically the whole of his active career. He lived near Oxford during the last years of his life.

We are indebted to Professor J. A. GUNN for the following appreciation: In his early days at Edinburgh University Dr. Sillar's chief responsibility was for the teaching of practical materia medica. This course was then compulsory for medical students, partly because a medical qualification carried with it the right to dispense medicines (and many more doctors in those days dispensed their own medicines than nowadays), but also, as Sillar so often emphasized, because good prescribing is scarcely possible without a sufficient knowledge of pharmacy and pharmacognosy. That worthwhile instruction was at all possible, with the large classes and small staff, was largely due to Sillar's book on practical materia medica, written expressly to suit the requirements, and very adequately fulfilling them. Another side of his teaching deserves special mention as it anticipated the future trend of pharmacological instruction. He conducted annually a voluntary class in experimental pharmacology, dealing with the methods of investigating the action of drugs on living tissues. So far as I know, this was the first class-instruction of this type to be given in any medical school in this country, though it has now rightly become almost universal. On several occasions, during the absence of Sir Thomas Fraser, Sillar acted as deputy professor, his well-delivered lectures proving very acceptable to students. For a period he acted as examiner in pharmacology in the University of Oxford. He published relatively little in his own name, but few publications from the department during his time failed to acknowledge indebtedness to him for his unselfish help in experimentation. He worked mainly on the actions of various species of *Strophanthus* and of snake-venoms. For his M.D. thesis on one of the latter (subsequently published in the *Transactions of the Royal Society*) he was awarded a gold medal.

Sillar was one of those unassuming and self-sacrificing men whose merits could be fully appreciated only by those who came into close association with him. Of these I had the privilege of being one, for he was to me successively teacher and colleague, and continuously wise friend and counsellor. After his retirement from Edinburgh he came to live near Oxford. In later years his activities were restricted by failing eyesight, until at last he became completely blind. This he bore with characteristic fortitude and serenity. He had a wide knowledge of literature and music, a discriminating taste, and a delicate and pervading sense of humour. These endowments, with the devotion of his wife, children, and grandchildren, sustained him to the end.

H. S. MEADE, M.Ch., F.R.C.S.I.

A colleague wishes to add this tribute to the obituary notice of Professor H. S. Meade (*Journal*, November 22, p. 1155): Harry Meade, after a trying illness, found peace on Armistice Day, as would indeed befit one who had seen such varied service in the 1914–18 war. Surgery in Ireland has lost one of its leaders. No one in that island was so well known in Britain and the Continent as he was. As President of the Royal College of Surgeons in Ireland and as President of the Association of Surgeons of Great Britain and Ireland, he had been selected for the highest honours by his colleagues both in Ireland and in Great Britain. Although further distinctions came his way from France, Belgium, and other countries he carried them all with a modesty which endeared him to his friends. He was the true example of the general surgeon. Although a member of the British Orthopaedic Association and the British Urological Association, he was just as interested in assisting at an intricate heart operation or a splanchnicectomy, and, as befits the teacher in charge of undergraduates and postgraduates, he brought to all branches of surgery the common sense born of experience. A new operation had to be proved to be accepted. He was respected by all for his sense of justice and fair play—a student wants nothing more than that. He was a boy at heart—whether it was his garden, his cacti, his stamp collection, he did everything with the enthusiasm of youth. He was equally willing to venture an opinion on the merits of a bottle of wine or the chances of a certain horse. He insisted, for his

annual Continental holiday, that he should learn the language of the country, which he did with the keenness of a schoolboy. He had friends in every capital in Europe. To know him well one had to stay with him in his very happy home surroundings, and the guest was at once overcome by the welcome afforded by his wife and himself. As a colleague and a co-examiner, one feels that a close friend has passed on; the many mourners at his funeral showed clearly that all Dublin felt the same.

C. E. TANGYE, C.B.E., M.D., D.P.H.

We are indebted to Sir Bernard Dawson, professor emeritus of obstetrics and gynaecology in the University of New Zealand, for the following appreciation of Dr. Claude Edward Tangye, whose obituary notice was published in the *Journal* of September 20 (p. 671):

The death of C. E. Tangye has left us bereft of a gallant and generous colleague, with whom it was my privilege to walk step by step throughout our medical training in Birmingham and then to gain a friendship cherished for nearly half a century. Indeed we fulfilled the often expressed but seldom achieved hope of keeping in touch by exchanging at least two or three letters each year even though 12,000 miles apart. As a student, older than most of us, he was known as "the great and good man," appellations endorsed by his life of public service and his loyal friendships. His letters were full of classical erudition, pawky humour, and fair comment, especially of the ebb and flow of the social security negotiations. At the time of his retirement he wrote, "It is time to leave. I'm too old to keep pace with test-tube babies and brain-slicing." His intellectual honesty and clarity of mind disliked the pretentious or pontifical, which he delighted to "debunk" with kindly but forthright emphasis. He was one of the few for whom we may justly borrow the epitaph written by Rudyard Kipling for his brother-in-law:

"He scarce had need to doff his pride or slough the dross of earth—
E'en as he trod that day to God so walked he from his birth,
In simpleness and gentleness and honour and clean mirth."

Tangye has returned to his native Cornish earth to rest with his beloved wife in the shade of the beautiful church of St. Just-in-Roseland.

DR. ALAN HARGRAVE PINDER, who died on October 15, practised for many years in Liverpool. He was born in Manchester on November 5, 1879, the son of a doctor, and was educated at Uppingham School and at St. Bartholomew's Hospital, qualifying M.R.C.S., L.R.C.P. in 1905. His first appointment was that of house-surgeon at the Royal Southern Hospital, Liverpool, in 1905, at a time when Sir Robert Jones's orthopaedic clinics were becoming world-famous and when Ronald Ross was establishing the Liverpool School of Tropical Medicine. He was subsequently resident medical officer at Walton Hospital, and in 1911 he settled in general practice in the Stoneycroft district of Liverpool. As an undergraduate he played rugby football for his hospital. Later, he played cricket for Bootle and was a member of the West Derby golf club. Dr. Pinder served in France in the war of 1914–18 with the West Lancashire field ambulance. He never joined the "panel" or enrolled in the National Health Service, his practice being a very personal one, and to a marked degree he was an adviser and friend of his patients. This year he was made an honorary member of the Liverpool Medical Institution on completion of 40 years of membership. By nature he was gay, happy, and extremely kind, and he was a very staunch and loyal friend. He was one of the most beloved medical practitioners in Liverpool, and will be greatly missed by all who knew him. His wife predeceased him and he is survived by his only daughter.—O. H. W.

DR. JOHN FRITH RICHES, who died suddenly at his home in Apperley Bridge, Yorkshire, on October 2, was born in London on November 7, 1902, and was educated at Alleyn's School, Dulwich. He trained at St. Thomas's Hospital, and qualified M.R.C.S., L.R.C.P. in 1930. He decided early to specialize in psychiatry, and went in 1932 to St. Luke's Hospital, Middlesbrough, where he was deputy medical superintendent when, in 1938, he was appointed consultant psychiatrist at Hemlington Emergency Hospital, Middlesbrough. From there he entered the Army and served from 1942 to 1946, first as area psychiatrist and later as psychiatrist to War Office selection boards. He was one of the original team of psychiatrists and psychologists whose pioneer research resulted in the new techniques that revolutionized the selection of personnel in the Services. After the war his enthusiasm for the new field he had done much to open up would not allow him to return to the easier road of hospital practice. Instead, he accepted a post as consultant psychiatrist to a group of companies, to continue in industry his study of personality, group relationships, and selection methods. In this little-explored territory he was again a pioneer, working alone but not in isolation, as he maintained close contact with colleagues in the North and at the Tavistock Clinic in London. He was a frequent and welcome visitor at the Leeds University department of psychiatry, and was a founder of the Leeds Regional Psychiatric Association and a member of the executive. He had a growing practice as a consulting psychotherapist and gave himself unsparingly to his patients.

A colleague writes: John Riches was a rare type of man. His outstanding qualities were modesty, gentleness, and consideration for others. He had an unusual mildness and tolerance, so that he seemed quite lacking in aggressiveness and self-assertion, yet his tenacity in maintaining what he thought right and good was unshakable. His personality was a great asset to a team; he was warm, loyal, clear-sighted, and without personal ambitions. In his work in industry he believed in a combination of individual therapy and group discussion, and the results he achieved justified his methods. His fellow workers, from managing director to operative, held him in high regard and went freely to him with their problems. He had gathered together much new material, and it is tragic that his early death prevented its publication. What leisure he had was spent with his family and friends at home, in the Dales, or in Anglesey. He loved music and the countryside. His warm, unaffected sincerity made many friends, to whom his death has brought an abiding sense of loss. Their sympathy goes out to his widow and children.

DR. GUY RICHMOND ASPINWALL, who died suddenly on October 11, was born at Diggle, Yorkshire, on November 10, 1892, and was educated at Wakefield Grammar School and Clare College, Cambridge. On August 4, 1914, he volunteered for military service, and, on being commissioned, served with the 10th West Yorkshire Regiment, holding the rank of captain. He went overseas in July, 1915, and, after being wounded, returned to complete his medical training at Guy's Hospital, where he was in the rugby fifteen. Qualifying L.M.S.S.A. in 1920, he then entered into practice with his father, Dr. J. F. Aspinwall, at Marsden, near Huddersfield, where he remained for 32 years until the time of his death. During the last war Dr. Aspinwall was second in command of the Colne Valley Home Guard. "Dr. Guy," as he was known in the district, was much loved and respected by all his patients for his quiet, sympathetic manner and for his unsparing attention to their needs. His particular interest in children was reflected in his 25 years' service as medical officer to the Marsden child welfare clinic. His chief pastimes were golf, bridge, and motoring, and he had a great love of literature. He underwent an operation in July this year and insisted on returning to his practice before he had fully recovered. His sudden death came as a great shock to his patients and friends and he will be deeply mourned. He leaves a widow.

Medical Notes in Parliament

THE INTERN YEAR

Mr. IAIN MACLEOD moved on November 19 that the draft Medical Acts, 1950 (Period of Employment as House Officers), Regulations, of Approval Order of Council, 1952, be approved. He said that a period of compulsory hospital service for duly qualified doctors, called the intern period, was a feature of the Medical Act of 1950. The General Medical Council was empowered to prescribe, subject to the Privy Council and to an affirmative resolution of both Houses, what that period should be. The Order as made by the G.M.C. laid down that the period of pre-registered service should be 12 months. The Ministry had received no official objections to the period being 12 months, and all the appropriate official organizations had been consulted. The appointed day under the Order was January 1, 1953. That date had also been decided after consultation with all the organizations concerned.

Mr. A. BLENKINSOP said it was proper to ask the Minister whether any progress had been made in considering the time for qualification, which was desperately long. More and more time was added to the period of training, so that the fully fledged doctor grew older and older before he could take part in active practice. He would be glad to hear whether any experimental steps had been taken to review items in the curriculum to get the period down to the Goodenough Committee's recommendation of 4½ years. He asked whether the Minister was satisfied that suitable posts were available for all those who would need to have posts found for them for this period. These posts were not merely to be a continuance of the old house-officer appointments. It should be possible for the intern to move around in hospital and get valuable extra training. He understood that discussions were going on both with teaching hospitals and regional hospital boards about the possible freezing of staffs in the hospitals. Such a freezing of staff at the time when the new proposal was set on foot would be retrograde and unfortunate. The allowances which had been agreed on were at the rate of £350 a year for the first six months of the intern year and £400 a year for the next six months. The cost of living had risen, and he asked whether the allowances had been reconsidered.

Dr. BARNET STROSS said some students felt a grievance. These included women students who were married and felt that a year separated from their families might create a special difficulty. He asked the Minister whether it would be possible for the authorities to arrange the positions to be found for these women as near as possible to their homes or medical schools.

Finding Posts

Mr. JOHN HYND said he understood that lists had been published in September which showed that, at least at the beginning, more than sufficient posts would be available for all the students likely to go through the schools in the course of next year. Under the new arrangement students might have to wait a number of weeks before getting intern posts. He understood that their grants finished when they passed their examination. If they were unable to find a post in a hospital for several weeks or months, what would happen to them? Between 70% and 80% of medical students largely depended on these grants. He thought that all posts should be advertised.

The difficulty probably could be overcome by encouraging students to apply for posts before they passed their examination and by encouraging hospitals to offer posts to students before they qualified. Suggestions were being made that the regions should consider that idea, but he foresaw much difficulty. In the London region in the last four examinations there were no less than 50% failures. This meant that if students had been given posts in hospitals depending upon their success 50% of the posts would be unfilled after the examination. Others who had accepted posts not so satisfactory elsewhere would be barred from these better posts which became vacant. Students would depend for their final registration after 12 months' hospital service on satisfactory reports from the hospital. He did not think that the interns should be regarded as students dependent for final registration upon having a satisfactory report. A lot would depend on the prejudices of the hospital authority. At least there should be a compulsory provision that any student who during the 12 months was not satisfactory in any respect should be warned as soon as possible. If at the end of 12 months he was refused registration by the G.M.C. some kind of arrangement must be set up so that he could appeal, bring evidence, and plead on his own behalf.

Dr. STROSS intervened to say that the student should receive a first certificate at the end of the first six months and a final one at the end of the year, so that if he fell in trouble in the second months he would only have a further six months to do.

Mr. HYND said he thought the satisfactory course would be to drop the reference to satisfactory service altogether.

Litigation against Interns

Mr. SOMERVILLE HASTINGS said the medico-legal relationship of the intern should be considered. Litigation for alleged neglect in hospitals had increased enormously since the appointed day. These young men and women would be able to get another opinion in most cases, but at many times the young doctor would have to ask himself, "Shall I take the case into hospital or chance it?" Those who lived on litigation would soon learn that there were unregistered interns and would be ready to apply for compensation in cases where these junior people were involved. He asked whether it was possible in all hospitals for every resident officer under this new set-up to be insured in a medical protection society and whether the Minister could insist on it.

Minister's Reply

Mr. MACLEOD replied to the debate. He said it was everyone's opinion that there would be enough posts, but it did not follow that there were enough in the right places. Some areas would be exporting areas, London and Scotland being included in them, and many others would be importing areas. Often the student when he qualified would be able to spend part or all of his pre-registration year in the hospital where he studied as an undergraduate. The dean of the medical school would be able to advise the student whether any posts were available at the hospital to which the medical school was attached.

He had invited hospital authorities to co-operate with universities and medical schools to ensure that newly qualified doctors did not have to wait an unreasonable time before they took a hospital post. There might of course be some gap. Members had asked what was to happen in the intervening period. The overwhelming majority of these people would be ex-Service students. They had been eligible to receive modified allowances from the Ministry of Education during the period spent as house officers after obtaining medical qualification. That was to be continued for the pre-registration services. There could be an extra £25 a year for keeping two homes, an extra £44 a year for the first dependent child and £27 a year for a subsequent child. At the university a married man with one child received during training £427 a year untaxed. The same person on being a house officer would get an average of £375 for the year—more of course in the second half-year—£25 for the double residential allowance and £44 for the first child. That came to £444, and tax and National Insurance would leave a net amount of £414 12s. 6d. It was possible for him to have an extra grant for exceptional hardship of £25 a year. Before an officer was entitled to obtain a post or while he was uprooting himself and taking the new post the Ministry of Education would pay a sum based on the usual vacation allowance to newly qualified men who could not get a house

post as soon as they qualified. This would be paid for a period not exceeding two months and would be the appropriate proportion of the vacation allowance previously paid, plus dependants' allowance.

On the question of the certificates and a satisfactory report he did not think that the idea of an appeal against an unsatisfactory report could be entertained. The suggestion of a warning seemed to him to be sound, but he would not as Minister be responsible for laying down what should be the content of medical education. There were appropriate authorities for deciding what form the curriculum and this certificate should take. He promised to examine the suggestion that every resident officer should be compulsorily insured by a medical protection society.

The House without a division approved the draft order.

CARE OF OLD PEOPLE

Mr. H. HYND on November 19 opened a discussion on geriatric treatment. He said that in practice there were many cases in a no-man's-land between health and sickness who did not seem at present the clear responsibility of the hospital or the county council. A permanent place was needed for people who were aged and infirm but not chronic sick. It should be linked with the geriatric service of the nearest hospital. Many could be put on their feet by proper geriatric treatment. Unfortunately neither the county council nor the hospital seemed to have power at present to set up homes for such cases. Some hospitals defined lack of bodily health or strength as sickness and some did not. The Act of 1948 allowed local authorities to arrange with voluntary organizations to do this kind of work. The Government might well give more encouragement to such bodies. The ultimate aim must be to have in each area a comprehensive service for the care of old people, with someone responsible for linking its various parts together. Medical officers in many cases were struggling against heavy odds to get something done.

Mr. J. K. VAUGHAN-MORGAN said that in the old days the relieving officer had a statutory right to demand that a hospital roof was put over a sick person's head. The Ministry should bear in mind the restoration of that statutory power either to the medical officer of health or to the county welfare officer.

Mr. JAMES JOHNSON said it was fatally easy for a social welfare officer to call in a doctor and have an old man certified for a mental institution. He hoped Miss Hornsby-Smith would tell the House whether this had been happening and how it could be overcome.

Mr. JAMES CARMICHAEL said he knew a hospital in Glasgow which was being turned over entirely to the aged people. The announcement indicated that nothing would be done for them except to give them kindly nursing, and that in due course they would be carried out. That was a completely wrong approach to the problem.

Fears Emphasized

Miss P. HORNSBY-SMITH replied. She said the debate was important and interesting. The fear of patients being certified by over-zealous medical officers who were anxious to find them accommodation of some kind was much overemphasized. The patient could be sent voluntarily for observation to various hospitals if showing signs of mental disorder, and it was up to him to discharge himself any time he wished. Patients could be certified only on medical examination and recommendation, and on the order being signed by two justices of the peace. Justices of the peace did not lightly sign these orders.

Where the medical side and the local authorities cooperated fully and beds were available, the statutory and administrative arrangements should be adequate to meet all cases, though she did not deny there was a shortage of beds. Hospital authorities were responsible for the sick, and local authorities for others in need of care and attention. It was an obligation. Through the boards all hospitals had been recommended not to refuse borderline cases where there was a doubt and where there was a recommendation from the general practitioner or the welfare officer to the medical officer because the person lived alone and could not obtain proper attention and care. The making of a new classification would not provide any more beds. The solution lay in much more accommodation. The Ministry wished to see flexible co-operation between local authorities and hospital services. It did not want an isolated geriatrics service.

A minority of people believed that their family responsibility for parents had disappeared with the creation of the National Health Service.

Priority of Cases

The appointment of some new officer to replace the relieving officer would not provide beds in the hospitals if the beds were not there. The general practitioner in contact with the patient, the county welfare officer, and the almoner of the hospital were qualified with all the facilities to make what provision lay within their power to provide accommodation for old persons. The only person who could decide the priority between two old persons was the hospital superintendent, and the Minister could not take from him the responsibility of deciding priority of cases put to him by many doctors in the area served by the hospital. In a particularly acute case, where the superintendent of the hospital said he could not take the case in, any medical officer had power and responsibility to use the bed service, which inquired over a wider range of area for immediate admission of an acutely ill person.

Another difficulty arose over patients who could not be released because of the problem of finding quick accommodation for them. There was an undoubted decline in the sense of responsibility in some families, who felt it cost them less when their parents had entered a hospital or home. More people were prepared to go into homes than ever before because these homes had lost the Poor Law stigma.

The time allotted by Standing Orders having been taken up, Mr. Speaker then adjourned the House.

ARMY MEDICAL SERVICES

Mr. A. ALBU raised on November 21 the case of a fusilier who from an early age had a history of some type of fits and suffered from further attacks when training in the Army. In March, 1952, a medical officer wrote to the man's National Health Service doctor that he was taking steps to see that the man was discharged from the Army, but by the time the parents received this letter their son was in Hong Kong. He also mentioned the case of a lance-corporal who had died in Catterick Camp military hospital in 1950 of pulmonary embolism and acute rheumatic carditis after having been confined to his barrack-room for five days before admission to hospital. A military court of inquiry was held which acquitted the medical authorities of negligence, but afterwards personal negligence was admitted.

He asked whether there was adequate medical supervision of the young doctors, whether there were adequate arrangements for bedding-down sick men before the admission to hospital, with proper medical orderlies and special diet if necessary, and proper arrangements for ambulances and stretcher parties when men had to be removed from barrack-rooms to hospital. Mr. Albu said the House knew that the medical profession was one of the closest trade unions in the country and that there was difficulty in bringing a case of negligence against a doctor. Yet it was not the duty of the War Office to protect the medical profession or the doctors in the Army if they were guilty of negligence.

In Good Health

Mr. J. R. H. HUTCHISON, Under-Secretary for War, said the Services at present were responsible for a total of about 750 000 persons. The health of the Army had never been better. Admissions to hospitals had shown a continuous decline all through this century and were still declining, except when war was taking place. The health of troops in overseas stations was impressive. The posts of Army medical

officers were filled by medical recruitment and by National Service men. All these National Service medical officers were fully qualified and the great majority had some six months' hospital experience. Next year that period would be extended to 12 months. These National Service officers were doing an extremely good job.

A gap had revealed itself in the more experienced type of officer. There was a shortage of medical officers with five to ten years' experience, many of whom were specialists. Measures to improve the situation were under review. The War Office had expanded the number of administrative commissioned officers in the R.A.M.C. so as to free purely medical officers for purely medical duties. The War Office was anxious to recruit more nurses. Honorary consultants to the Army were appointed by the Secretary of State for War after consultation with the Royal College of Physicians and the Royal College of Surgeons, and were available for consultations all over the country, and in some cases abroad. Close links existed with the local civilian medical service, and facilities worked both ways. Of course there would be mistakes, and when these occurred in the Army someone hurried to bring them into the limelight. The War Office had behaved honestly in admitting an error of diagnosis in the lance-corporal's case. As a result of this case a number of administrative rules had been altered and tightened. In the other case raised by Mr. Albu there was a conflict of medical opinion. The man had been fully investigated, and a diagnosis of migraine made. In no attack had he lost consciousness. In March, 1952, his unit medical officer corresponded with his civilian doctor, whose letter stated that he suffered from epilepsy. The medical officer accepted this as a proper diagnosis. Thereafter the man was referred to Shorncliffe Military Hospital, where migraine was again diagnosed. The parents resisted the statement that their son was epileptic. Before Mr. Albu took the case up the man was already in Hong Kong. When the case was brought before Mr. Hutchison he instructed that the man should be brought home for further investigation. This was being done.

Integration with Civilian Services

Mr. G. WIGG said a considerable number of young National Service officers were able and keen on their job, but the majority of senior officers of the R.A.M.C. had never opened a medical book since the time they qualified. They were engaged in administration and completely out of touch with modern methods. The remedy was for Mr. Hutchison to do what he could to integrate the medical services in all the Services with the civilian services.

Mr. HUTCHISON said the integration was happening. He resented Mr. Wigg's implication that senior medical officers in the Army were bad. Some 40% or 50% of them were specialists.

The discussion then ended.

Reducing Hospital Staffs

Mr. N. N. DODDS, on November 20, asked the Minister of Health to make a statement "in view of the widespread concern at the suggestion by his department to regional hospital boards for reducing hospital staff levels."

Mr. IAIN MACLEOD replied that he was anxious that all proper economy should be observed in staffing the hospitals, and was considering what further guidance he should give on this subject to employing boards and committees.

Approved Hospitals

Mr. GEORGE JEGER asked on November 20 why many non-teaching hospitals in the Sheffield Regional Hospital Board area were excluded from the list of approved hospitals and institutions and recognized house-officer posts under the Medical Act, 1950. Mr. I. MACLEOD replied that Section 2 of the Medical Act, 1950, gave him no jurisdiction in the approval of these posts. The Act left the approval of posts for this purpose entirely to the licensed bodies—that is, the universities, and, in England, the Conjoint Board of England (representing the Royal Colleges) and the Society of Apothecaries.

Private Members' Bills

Twenty Private Members' Bills were presented and read for the first time on November 19. They included the National Insurance (Industrial Injuries) Bill (Mr. T. B. Watkins); the Foundry Workers' (Health and Safety) Bill (Miss M. Herbison); the Pharmacy Bill (Mr. J. Hall); and the Abortion Bill (Mr. J. Reeves).

Vital Statistics

Road Accidents in October

The number of road casualties so far reported as having occurred in October is 17,620. This total includes 413 killed and 4,429 seriously injured. Although there may be a few more reports to come in, it is expected that the final figures will be considerably lower than in October, 1951, when there were 18,597 casualties, including 480 killed and 4,369 seriously injured.

Week Ending November 15

The notifications of infectious diseases in England and Wales during the week included: scarlet fever 2,065, whooping-cough 1,780, diphtheria 44, measles 12,035, acute poliomyelitis 104, dysentery 211, paratyphoid fever 5, and typhoid fever 3.

Infectious Diseases

A small decline occurred in the incidence of most infectious diseases in England and Wales during the week ending November 8. The largest falls were 200 for dysentery (from 413 to 213), 118 for scarlet fever (from 2,094 to 1,976), and 73 for acute pneumonia (from 575 to 502).

Although the incidence of scarlet fever declined, the largest local variation was an increase of 64 in the London notifications (from 120 to 166). The number of notifications of whooping-cough, 1,449, was the same as in the preceding week, and only small fluctuations were recorded in the local trends during the week. The notifications of measles increased by only 41 (from 11,223 to 11,264), but there were considerable fluctuations in the local trends. The largest were rises of 179 in Kent (from 466 to 645) and 141 in Northants (from 185 to 326), and falls of 263 in London (from 1,252 to 989), 205 in Yorkshire West Riding (from 1,105 to 900), and 113 in Durham (from 525 to 412). 27 cases of diphtheria were notified, 2 fewer than in the preceding week. The chief features of the returns for diphtheria were an increase of 5 in Lancashire (from 4 to 9), and an increase of 3 in Staffordshire (from 5 to 8). These two counties provided almost two-thirds of the total notifications.

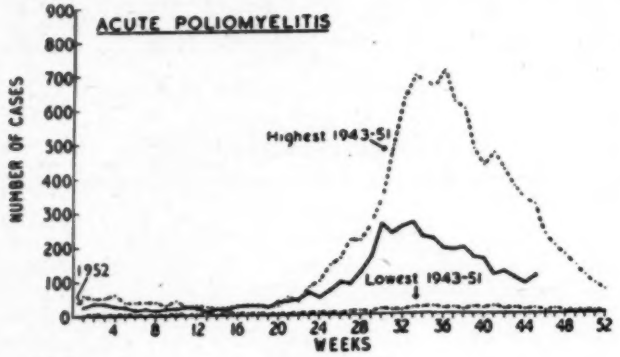
Only 2 cases of paratyphoid fever were notified—5 fewer than in the preceding week. This is the lowest level of paratyphoid fever since the beginning of 1951.

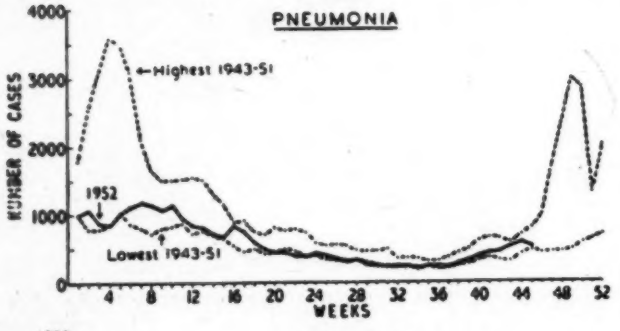
117 cases of poliomyelitis were notified, and these were 16 more for paralytic cases and 15 more for non-paralytic cases than in the preceding week. The largest returns during the week were Sussex 16 (Rye M.B. 10), Surrey 13, Essex 11 (Southend-on-Sea C.B. 7), and London 9.

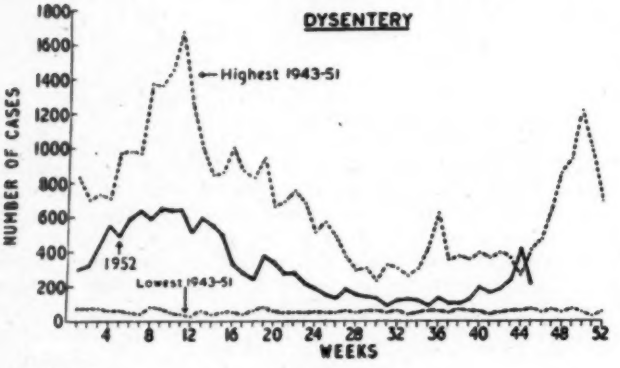
The fall in the incidence of dysentery was due to the fall in notifications in Lancashire from 257 to 78. 36 further cases were notified in Blackpool C.B., where 296 cases were notified in the preceding fortnight. The other large centres of infection in this county were Liverpool C.B. 18 and Blackburn R.D. 10. The largest of the other returns in the country were London 24 and Kent 15.

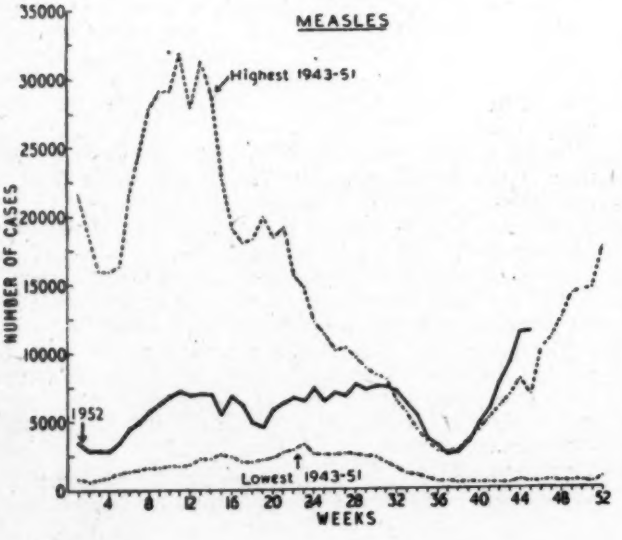
Graphs of Infectious Diseases

The graphs below show the uncorrected numbers of cases of certain diseases notified weekly in England and Wales. Highest and lowest figures reported in each week during the nine years 1943–51 are shown thus - - - - - - -, the figures for 1952 thus ———. Except for the curves showing notifications in 1952, the graphs were prepared at the Department of Medical Statistics and Epidemiology, London School of Hygiene and Tropical Medicine.









INFECTIOUS DISEASES AND VITAL STATISTICS

Summary for British Isles for week ending November 8 (No. 45) and corresponding week 1951.

Figures of *cases* are for the countries shown and London administrative county. Figures of *deaths* and *births* are for the 160 great towns in England and Wales (London included), London administrative county, the 17 principal towns in Scotland, the 10 principal towns in Northern Ireland, and the 14 principal towns in Eire.

A blank space denotes disease not notifiable or no return available.

The table is based on information supplied by the Registrars-General of England and Wales, Scotland, N. Ireland, and Eire, the Ministry of Health and Local Government of N. Ireland, and the Department of Health of Eire.

CASES in Countries and London	1952 Eng. & Wales	1952 Lond.	1952 Scot.	1952 N. Ire.	1952 Eire	1951 Eng. & Wales	1951 Lond.	1951 Scot.	1951 N. Ire.	1951 Eire
Diphtheria	27	1	14	0	1	42	2	14	0	0
Dysentery	213	24	109	1	2	192	28	63	1	1
Encephalitis, acute	6	0	0	1		6	0	1	0	1
Enteric fever: Typhoid	4	0	1	15		4	2	0	0	0
Paratyphoid	2	0	1 (B)	0		10	0	0	1	
Food-poisoning	110	7		0		95	13		3	
Infective enteritis or diarrhoea under 2 years				10	23				24	18
Measles*	11,264	989	155	21	139	1,935	50	90	131	124
Meningococcal infection	30	3	17	0		37	3	9	4	1
Ophthalmia neonatorum	34	4	10	0		32	2	7	0	
Pneumonia†	502	33	282	8		479	34	199	8	
Poliomyelitis, acute: Paralytic	81	6	5	2	3	56	5	10	-	2
Non-paralytic	36	3				22	4			
Puerperal fever§	211	23	12	0	2	220	27	1	0	1
Scarlet fever	1,976	166	381	22	115	1,232	142	302	2	55
Tuberculosis: Respiratory			124	19				130	29	
Non-respiratory			19	6				37	4	
Whooping-cough	1,449	80	74	28	108	1,625	61	353	45	82

DEATHS in Great Towns	1952 Eng. & Wales	1952 Lond.	1952 Scot.	1952 N. Ire.	1952 Eire	1951 Eng. & Wales	1951 Lond.	1951 Scot.	1951 N. Ire.	1951 Eire
Diphtheria	2	0		0	0	*1*	0	*0*	0	0
Dysentery	0	0		0			0		0	
Encephalitis, acute		0			0		0			0
Enteric fever	0	0		0		*0*	0	*0*	0	
Infective enteritis or diarrhoea under 2 years	7	1	1	0	2	*8*		*3*	0	2
Influenza	10	0		0		*22*	5	*0*	0	0
Measles		0		0	0		0	*0*	0	1
Meningococcal infection		0	2				2	*0*		
Pneumonia	176	35		5	5	*195*	39		8	6
Poliomyelitis, acute	2	0			0	*3*	0			0
Scarlet fever		0		0	0		0	*0*	0	0
Tuberculosis: Respiratory	117	10	9	1	3	*124*	20	*19*	9	12
Non-respiratory		3	2	0	3		1	*3*	0	2
Whooping-cough	1	1	1	0	0	*1*	0	*1*	0	0
Deaths 0–1 year	181	31	25	11	14	*206*	23	*28*	2	13
Deaths (excluding stillbirths)	4,803	693	469	100	164	*4,891*	762	*572*	98	147
LIVE BIRTHS	6,930	1058	760	207	402	*5,973*	971	*671*	185	407
STILLBIRTHS	185	13	23			*154*	16	*22*		

* Measles not notifiable in Scotland, whence returns are approximate.
† Includes primary and influenzal pneumonia.
§ Includes puerperal pyrexia.

Medical News

Quiet Life.—Sir Ronald Fisher, F.R.S., the new president of the Royal Statistical Society in succession to Professor A. Bradford Hill, delivered his inaugural address on November 19 on "The Expansion of Statistics." Drawing attention to some fundamental advances in the natural sciences during the nineteenth century, he pointed out that the statistical origin of some of them had been obscured, though as to the influence of Malthus on Darwin and Wallace it was scarcely his ideas but his rhetoric which had gone to their heads. When he (Sir Ronald) tried to explain the theory of natural selection to students, the phrases he found least helpful were those rather journalistic slogans, "The struggle for existence" and "The survival of the fittest." It was very natural to the human race, and very unphilosophical, to imagine that results of towering and majestic importance, such as the evolution of living creatures, must be brought about by equally powerful or violent causes. If we could imagine winkles or primroses *tense with struggle*, red in their non-existent teeth and claws, it became easier to believe that great things were happening to them, that they were being hammered into shape by cosmic forces. Whereas all we knew was that each was living its own quiet life, with the life table and the rates of reproduction characteristic of its genotype, and that for this reason, and for no other, these species were probably changing, imperceptibly slowly, but with a speed sufficient to make them perceptibly different if they kept it up for some millions, or tens of millions, of years. Natural selection had no need of all this "sound and fury, signifying nothing."

Kingston Foundation Appeal.—About a year ago an appeal was addressed to the medical profession and to the public to support a new voluntary hospital to replace the old Kingston Victoria Hospital taken over by the regional hospital board after a prolonged dispute. The Kingston and Malden Victoria Medical Foundation was founded to appeal for funds, and a letter at page 1206 from its chairman, Dr. F. B. Lake, describes the present position. The aim is to acquire and convert one of the large houses in the district into a hospital—the first voluntary hospital since the National Health Service began. The Foundation believes "that in creating a new independent local hospital we will do much to demonstrate the value of such institutions, and eventually help to establish the just place of the general practitioner in the Service."

Guy's–Maudsley Neurosurgical Unit.—A new building at Maudsley Hospital, Denmark Hill, to house the Guy's–Maudsley Neurosurgical Unit was opened by Viscount Waverley, chairman of the Postgraduate Medical Federation of London, on November 20. He explained that during the late war a neurosurgical centre was established at Dartford in connexion with the London County Council hospital there. For some time it was thought that the unit might be developed to serve the needs of King's College Hospital, Guy's, and Maudsley, as well as those of the south-east region generally. But it was decided later that it would be desirable to have another centre in close relation with the teaching hospitals and able to provide facilities for research. King's College Hospital, being in a position to make its own arrangements, dropped out of the scheme, and, as the laboratory facilities were already available at Maudsley, Guy's agreed that the centre should be established there in a new building, on the understanding that the surgeon in charge and the team would attend at Guy's as occasion required. The importance of the new unit lay not only in having available the surgeons to carry out operational techniques, but in the provision of facilities for the further study of the functions of various centres and tracts of the brain in relation to the spinal cord and the peripheral nervous system. Mrs. F. C. Ormerod, chairman of the board of governors of Bethlem and Maudsley, said that the late Professor Mapother had put forward the idea of a specialist neurosurgical unit. This was a new experiment in medical education and included both undergraduate and postgraduate teaching. The director of the unit is Mr. Murray A. Falconer. The cost of construction has been borne by the Exchequer, but the furniture and equipment have been bought out of the hospitals' endowments. [The photograph shows one wing of the unit.]

Annual Conference of Army Pathologists.—The sixth Annual Conference of Army Pathologists was held at the Royal Army Medical College, Millbank, London, on October 16 and 17. One morning was given up to technical demonstrations, and on the second day Brigadier A. Sachs, Director of Pathology, spoke on tetanus and prophylaxis; Professor E. J. King on tests of kidney function; Professor G. Hadfield on cellular pathology, with particular reference to the chemistry of cellular metabolism; Dr. Donald Teare on fatal, homicidal, suicidal, and accidental wounds; and Dr. Cullumbine on some medical aspects of chemical warfare research. The conference concluded with the annual Army Pathologists Dinner, which was held at the Junior United Services Club.

Hypnotism.—The London County Council is to control public performances of hypnotism from April 1, 1953. The licensee of a place of public entertainment will require the consent of the council in writing before allowing anyone to give an exhibition, demonstration, or performance of hypnotism on his premises.

Leeds Meeting.—A meeting of the North of England Obstetrical and Gynaecological Society was held in Leeds on November 21. Dr. Martin Williams described a case of locked twins, Dr. William Hunter read a paper on "Rotation of the Foetal Head in Occipito-posterior Positions of the Vertex," and Mr. G. W. Theobald showed two films of operations for prolapse.

Mr. Hilary Marquand, M.P., is to give a series of lectures to universities in India, Pakistan, and Ceylon, under the auspices of the British Council. Among other topics he will discuss the economic aspects of British social services and the National Health Service. Mr. Marquand was Minister of Health in the last Labour Government.

Emergency Bed Service: Applications and Admissions.—During the seven days ending November 24 the number of applications made by doctors to the London Emergency Bed Service for admission of patients was 1,108, of whom 91.24% were admitted.

NEW ISSUES

Journal of Clinical Pathology.—The next issue (Vol. 6, No. 4) will be available in a week's time. The contents include:

RUNNING STANDARDS IN CLINICAL CHEMISTRY AND THE USE OF THE CONTROL CHART. Richard F. Henry and Milton Segalove.
THE MICRO ESTIMATION OF SERUM IRON AND IRON-BINDING CAPACITY IN NORMALS AND IN DISEASE. G. Davies, B. Levin, and V. G. Oberholzer.
TRUE URIC ACID VALUES. J. M. Johnstone.
THE CARBOHYDRATES IN NORMAL AND ABNORMAL CEREBROSPINAL FLUID. Marjorie D. Eastham and Kenneth R. Keay.
OX-CELL HAEMOLYSINS IN HUMAN SERUM. G. B. Leyton.
EXTENSIVE MYELOID RESPONSE DURING FOLIC ACID THERAPY IN MEGALOBLASTIC ANAEMIA OF PREGNANCY. Grace M. Ritchie.
STUDIES ON THE NORMAL SERUM PANAGGLUTININ ACTIVE AGAINST TRYPSINATED HUMAN ERYTHROCYTES. PART I: THE MECHANISM OF AGGLUTINATION REVERSAL. Theodore H. Spaet and Betty W. Ostrom.
A CASE OF THE SCHÖNLEIN–HENOCH SYNDROME WITH MYOCARDIAL NECROSIS. M. A. Lecutier.
THE HISTOGENESIS OF FOUR CASES OF ANGIOMYXOMA OF THE AURICLE. C. Raeburn.
POLYETHYLENE GLYCOLS AS EMBEDDING MEDIA IN HISTOCHEMICAL WORK. S. Sriramachari and V. Ramalingaswami.
STANDARDIZATION OF THE DYE TEST FOR TOXOPLASMOSIS. J. K. A. Beverley and C. P. Beattie.
TWO SMALL COLONY VARIANTS OF STAPH. AUREUS ISOLATED IN PURE CULTURE FROM CLOSED INFECTED LESIONS AND THEIR CARBON DIOXIDE REQUIREMENTS. J. C. Shet.is.
COLOURING AGENTS FOR USE IN DISC-ANTIBIOTIC SENSITIVITY TESTS. J. H. Bowie and J. C. Gould.
TRANSFER OF FLUORESCIN FROM PS. PYOCYANEA TO COLONIES OF OTHER BACTERIA. L. Hurst and E. J. L. Lowbury.
MEDIA FOR THE ISOLATION AND DIFFERENTIATION OF PATHOGENIC BACT. COLI (SEROTYPES O 111 AND O 55). F. Rappaport and E. Henig.
THE DIFFICULTY CAUSED BY THE FRAGILITY OF THE OVA OF ASCARIS LUMBRICOIDES. K. B. Rogers.

Issued quarterly; annual subscription £2 2s., single copy 12s. 6d.; obtainable from the Publishing Manager, B.M.A. House, Tavistock Square, London, W.C.1.

COMING EVENTS

Harben Lectures.—Lord Horder has been appointed Harben Lecturer of the Royal Institute of Public Health and Hygiene for 1952. His lectures, on "Fifty Years of Medicine," will be delivered in the lecture hall at 28, Portland Place, London, W.1, on December 9, 10, and 11 at 4.30 p.m. each day.

Contraceptive Technique.—A lecture-demonstration on contraceptive technique will be given by Dr. Marie Stopes at the Mothers' Clinic, 108, Whitfield Street, London, W.1, on Thursday, December 4, at 2.30 p.m. No fee is charged, but tickets must be obtained in advance.

British Social Biology Council.—The British Social Biology Council has arranged a one-day conference on "Race Problems in the Light of Modern Science," at University College, London, W.C.1, on December 6. Further information may be obtained from the secretary of the council, Tavistock House South, Tavistock Square, London, W.C.1.

Nutrition Society Conference.—The Nutrition Society has arranged a one-day conference on "The Role of Vitamins in Metabolic Processes." It will be held at the Department of Biochemistry, Sheffield University, on December 20. Further details may be obtained from Dr. R. J. L. Allen, Monkhouse & Glasscock Ltd., Snow's Fields, London, S.E.1.

SOCIETIES AND LECTURES

Details in this column are necessarily brief. Further information and tickets where required (marked ●) should be obtained from the institution concerned.

Monday, December 1

BRITISH PSYCHO-ANALYTICAL SOCIETY.—At Royal Society of Medicine, 8.15 p.m. Ernest Jones Lecture by Professor R. W. Russell, Ph.D.: Behaviour Under Stress.
●INSTITUTE OF CHILD HEALTH.—5.30 p.m., Dr. H. Grüneberg: Animal Genetics and Diseases in Children.

Tuesday, December 2

●BRISTOL UNIVERSITY.—8.30 p.m., Carey Coombs Memorial Lecture, by Professor Geoffrey Hadfield: Bacterial Hypersensitivity and Rheumatic Carditis.
BRITISH POSTGRADUATE MEDICAL FEDERATION.—At London School of Hygiene and Tropical Medicine, 5.30 p.m., Dr. P. R. Peacock: Carcinogenesis.
●INSTITUTE OF DERMATOLOGY.—5.30 p.m., Dr. S. C. Gold: Lupus Erythematosus.

Wednesday, December 3

EDINBURGH CLINICAL CLUB.—4 p.m., visit to Rheumatic Clinic, Northern General Hospital.
HARVEIAN SOCIETY OF LONDON.—8.15 p.m., discussion to be opened by Dr. C. H. Andrewes, F.R.S.: Recent Work on the Common Cold.
●INSTITUTE OF DERMATOLOGY.—5.30 p.m., Dr. J. O. Oliver: The Hargraves Cell and L.E. Phenomenon.
INSTITUTE OF LARYNGOLOGY AND OTOLOGY.—5.30 p.m., Dr. Ettore Bocca (Milan): Laryngectomy with Block Dissection of the Neck Unilateral and Bilateral (illustrated).
LONDON ASSOCIATION OF THE MEDICAL WOMEN'S FEDERATION.—At Royal Free Hospital School of Medicine, 8.30 p.m., Mr. Charles Evans: Explorations in Solu Khumbu, Nepal (illustrated).
MANCHESTER MEDICAL SOCIETY.—4.30 p.m., Sir Geoffrey Jefferson, F.R.S.: Varying Behaviour of Pituitary Adenomas.
ROYAL INSTITUTE OF PUBLIC HEALTH AND HYGIENE.—3.30 p.m., Mr. A. Dickson Wright: Historical Review—Royal Illnesses.
ROYAL SANITARY INSTITUTE.—2.30 p.m., S. G. Burgess, Ph.D., F.R.I.C., D. Burns, A.R.I.C., and C. W. Tidy, A.M.I.H.V.E.: Investigations into Swimming Bath Water Treatment.

Thursday, December 4

BRITISH POSTGRADUATE MEDICAL FEDERATION.—At London School of Hygiene and Tropical Medicine, 5.30 p.m., Professor Wilson Smith, F.R.S.: Virus Adaptability in Relation to Human Disease.
HONYMAN GILLESPIE LECTURE.—At University New Buildings, Edinburgh, 5 p.m., Mr. W. Selby Tulloch: Surgery of the Prostate.
●INSTITUTE OF DERMATOLOGY.—5.30 p.m., Dr. H. Haber: Cellular Naevi and Melanomas.
INSTITUTE OF PSYCHIATRY.—3 p.m., Dr. A. G. M. Weddell: Mechanism of Cutaneous Sensibility.
LIVERPOOL MEDICAL INSTITUTION.—At David Lewis Northern Hospital, Leeds Street, 2.30 p.m., afternoon clinical meeting.
ROYAL COLLEGE OF SURGEONS OF ENGLAND.—5.30 p.m., Otolaryngology Lecture by Dr. C. H. Andrewes, F.R.S.: Common Cold.
ST. ANDREWS UNIVERSITY.—At Materia Medica Department, Dundee, 5 p.m., Professor F. A. E. Crew, F.R.S.: Medicine as an Instrument of Social Policy.
ST. GEORGE'S HOSPITAL MEDICAL SCHOOL.—5 p.m., Dr. A. S. Paterson: lecture-demonstration in neurology.
ST. MARY'S HOSPITAL.—At Wright-Fleming Institute, 5 p.m., Kettle Memorial Lecture by Dr. C. V. Harrison: Pulmonary Vessels in Mitral Stenosis.

Friday, December 5

●INSTITUTE OF DERMATOLOGY.—5.30 p.m., clinical demonstration by Dr. S. C. Gold: Lupus Erythematosus.
KING'S COLLEGE HOSPITAL MEDICAL SCHOOL.—4.30 p.m., Legg Memorial Lecture by Sir Ernest Finch: Romance in Surgery.
WHIPPS CROSS HOSPITAL MEDICAL SOCIETY.—8.30 p.m., debate to be opened by Dr. W. J. O'Donovan and Mr. A. E. M. Woolf: Should the Doctor Tell?

Saturday, December 6

MIDLAND TUBERCULOSIS SOCIETY.—At Chest Clinic, 151, Great Charles Street, Birmingham, Dr. V. H. Springett: Fates of Some Minimal Lesions.

APPOINTMENTS

BRITISH RAILWAYS (LONDON MIDLAND REGION).—*Assistant Medical Officers.* A. K. D. Rutherford, M.B., B.Ch., D. L. Waddell, M.B., Ch.B., P. B. R. Williams, M.B., Ch.B.

FENTON, JOHN, M.B., B.Ch., D.P.H., Medical Officer of Health, Metropolitan Borough of Hackney.

MANCHESTER REGIONAL HOSPITAL BOARD.—*Consultant Radiotherapist, Christie Hospital and Holt Radium Institute, Manchester,* H. C. Warrington, M.B., Ch.B., D.M.R.(T), F.F.R. *Consultant Anaesthetist, Blackburn and District Hospitals,* E. A. Milner, M.B., B.S., D.A. *Consultant Anaesthetist, Wigan and Leigh and Wrightington Hospitals,* A. E. Smith, M.B., Ch.B., D.A. *Consultant Psychiatrist, Blackburn and Burnley and Whittingham Hospitals,* M. Silverman, M.D., D.P.M. *Consultant Psychiatrists, Barrow and Kendal Areas and Lancaster Moor Hospital,* A. A. Martin, L.R.C.P.&S.Ed., D.P.M. *Consultant Orthopaedic Surgeon in charge of Orthopaedics and Accident Services in Wigan and Leigh Hospitals,* E. W. Knowles, M.Ch.(Orth.), F.R.C.S.Ed. *Consultant (Assistant) General Surgeon, Preston and Chorley Hospitals,* J. Y. W. Russell, F.R.C.S.Ed. *Tuberculosis Physician, Blackburn and District Hospitals,* R. Stalker, M.B., Ch.B.

BIRTHS, MARRIAGES, AND DEATHS

BIRTHS

Caldwell.—On November 16, 1952, at the Southampton Maternity Unit to Isabel, wife of Dr. W. G. D. Caldwell, a son.
Fatti.—At Johannesburg, South Africa, to Mavis, wife of Mr. Libero Fatti, M.B., F.R.C.S., a daughter—Elisa Margherita.

DEATHS

Dickson.—On November 8, 1952, at his home, 52, Inverleith Place, Edinburgh, Robert Milne Dickson, O.B.E., M.D., D.O.M.S., colonel, late R.A.M.C., retired.
Dingwall.—On November 10, 1952, at 9, Lynedoch Street, Glasgow, Alexander Dingwall, M.B., C.M.
Paterson.—On November 7, 1952, at Chatfield, Alton Road, Parkstone, Dorset, Archibald Richard Paterson, M.D., aged 81.
Ridewood.—On November 8, 1952, in London, Harold Edward Ridewood, M.D., M.S., F.R.C.S., F.A.C.S., of Victoria, British Columbia, Canada.
Sadler.—On November 10, 1952, Agnes Rennie Scott Sadler, M.B., Ch.B., of Clifford House, Tweedmouth, Berwick-on-Tweed.
Williams.—On October 27, 1952, at Taldrwst, Dwyran, Anglesey, William Hugh Williams, M.D., aged 84.
Williamson.—On November 5, 1952, in a nursing-home, Harold Joseph Williamson, M.D., C.M., M.C.P.S.Ont., of 64, Shrewsbury Road, London, N., formerly of Kingston, and Port Arthur, Ontario, Canada.
Wood.—On November 8, 1952, at the Queen Elizabeth Hospital, Birmingham, Helen Margaret Wood, M.B., Ch.B., D.A., of Mayfield, Henley Road, Ludlow, Salop, and Milford-on-Sea, Hants.

Any Questions?

Correspondents should give their names and addresses (not for publication) and include all relevant details in their questions, which should be typed. We publish here a selection of those questions and answers which seem to be of general interest.

Hazards of the Diabetic Mother

Q.—*What hazards must a diabetic woman face if she is to have a family? How can they be prevented or minimized? Are there any absolute contraindications to childbearing in a diabetic mother?*

A.—Provided that the diabetes can be carefully controlled throughout pregnancy, the diabetic woman takes no great risk by becoming pregnant; the maternal mortality rate is in the region of 1 to 2% at the most. As suggested above, careful control of the diabetes is the most important measure to minimize the risks, and should be associated with careful antenatal care. The presence of serious complications, such as albuminuria, hypertension, and serious retinitis, are contrary indications to pregnancy from the mother's point of view, and a strong family history of the disease, especially if it is on both sides of the family, from the point of view of the child.

Lying and Thieving Children

Q.—*Why do some children make a habit of lying and stealing, and how should they be treated?*

A.—To know that a child steals and lies is just a beginning. Details of various examples and both their immediate and their long-term setting need to be known.

Stealing may be clever and secret or it may be obvious; it may be rare or frequent; what is stolen may be always the same or it may seem to be indiscriminate. Stealing may be solitary or it may be with others. It may be what would be called larceny, burglary, or robbery in an adult. It may be to satisfy an obviously frustrated desire for possession. It may be an imitation of adults or other children, perhaps to obtain the open favour of someone. It may be due to jealousy with or without vindictiveness to the person stolen from. It may be the one aspect of behaviour that leads to the discovery of some degree of mental defect. In the most serious and prolonged thieves it is usually associated with a history of major thwarting of good personal relations in early life, and such a thief has difficulty in making good personal contacts later.

What seems to be lying may simply be due to immaturity in speech and immaturity in developing concepts of truthfulness. It may be part of a phase of general negativism in which the truth is often reversed. It may be boastful exaggeration. It may consist of fabrications to hide anxiety or guilt, or it may be a way of showing anger by making false accusations. The developing child bases many of his standards on imitation, and when grown-ups lie or have difficulty in talking to the child about the relationship of fact and fancy the child soon picks up the adult's habits. This is often seen, for instance, in parents' attitudes to the truth about sexuality, fairy stories, Father Christmas, etc.

In general, the treatment of stealing and lying should be, first, by coming to an understanding oneself, and, secondly, by helping the child to come to an understanding himself of what is happening. If the stealing or lying has been present for long, the child will probably have forgotten its origin, even if he did understand what was going on when he began to steal or lie. On the basis of understanding can be built hope of developing better ways of gaining ends than by continuing to steal and lie. Rewards and approval for progress will help, but the rewards should not just be for progress in losing bad habits. Rewards should be for progress in discovering better ways of coping with the problems which previously were dealt with by dishonesty and deceit.

Aminophylline and Adrenaline

Q.—*I have seen it stated in a medical journal that adrenaline administered before aminophylline will double the toxicity of the latter drug. Is this true?*

A.—The accepted and widely used treatment for status asthmaticus has been for many years, essentially, subcutaneous adrenaline until the patient is obviously adrenaline-resistant, followed by intravenous aminophylline (0.25 to 0.48 g.). The intravenous aminophylline *must* be given slowly, preferably over 5 to 10 minutes, for acute collapse may occur if it is given too rapidly. No deaths have been recorded following this treatment in status asthmaticus, nor has the writer seen collapse occurring when this treatment was properly carried out. The deaths that have been recorded following intravenous aminophylline have been in patients with cardiac damage—that is, when there was evidence of previous coronary disease or severe myocardial damage—but, as far as the writer is aware, previous adrenaline had not been given. It is known that in mice ephedrine will double the toxicity of aminophylline, but one does not know how far such studies in animals are applicable to man. In any case, the recommended therapeutic dosage of aminophylline in man is so far below its lethal dose that such a synergistic toxic effect should not be of any practical importance.

Spinach

Q.—*What is the nutritive value of spinach and "spinach beet"? Are they good for children?*

A.—Both real spinach and the green tops of the "spinach beet" are very rich sources of carotene, from which vitamin A is formed in the body. They are also among the best vegetables for iron, and are good sources of vitamin C. Since the body's demands for vitamins and minerals are increased during growth spinach would seem to be particularly valuable for the nutrition of children, provided they can be persuaded to acquire a liking for its somewhat bitter taste.

Fibre-glass

Q.—*In what processes is fibre-glass used? Is it hazardous to health in any way?*

A.—Fibre-glass consists of fine, flexible glass fibres having a high tensile strength, which increases rapidly as the diameter of the fibres decreases. Staple fibres may be manufactured from which yarn is made and used in much the same way as any other textile material. Uses of fibre-glass mentioned by Fairhall[1] are as curtains and hangings, separators in storage batteries, filter media in filter presses, as a reinforcement for plastics, and as a filling for pillows and mattresses. It is also used as a filter for blood plasma, as surgical suture material, as a tracer thread which is opaque to *x* rays in surgical sponges, and for lightweight artificial limbs. Rock or mineral wool, sometimes included with fibre-glass in the term "glass-wool," is composed of fine interlaced mineral fibres and is used as an insulating material.

The sharp ends of the fibres cause redness and irritation of the skin, and sometimes small papules. These effects are transitory and are caused by fibres adhering to the skin. Friction which tends to rub them in, or excessive perspiration, will increase the irritation, but unless the fibres are rubbed into the skin they are removed easily by washing. There is no evidence of injury to the lungs among workers in the mineral or glass-wool industries.

Protective measures in handling fibre-glass are directed towards avoiding accumulation of fibres on the skin. Loose overalls with no constricting bands at the neck, wrists, waist, or ankles should be worn and laundered frequently, preferably at the works. Adequate washing facilities, including shower-baths, should be provided, and lockers in which

street clothes may be hung separately from work clothes are essential so that outdoor clothes will not collect glass fibres. Calamine lotion to which has been added 1% phenol relieves the skin irritation. Goggles should be worn to protect the eyes when fibre-glass is used for overhead work. In the factory sweeping should be done by vacuum cleaners, and waste material should be kept in covered bins.

REFERENCE

1 Fairhall L. T. (1949). *Industrial Toxicology*, p. 73. Williams and Wilkins, Baltimore.

Anosmia after Respiratory Infection

Q.—*A lady of 68, who has had many attacks of influenza since 1918, has made an uninterrupted recovery from her last attack two months ago, except for persistent anosmia. What is the cause and treatment of this condition?*

A.—Persistent anosmia is a fortunately uncommon sequel to a severe upper respiratory tract infection. As in such cases there is no hindrance to the entrance of vapour to the olfactory part of the nasal mucous membrane, one can only conclude that the cause is due to a fibrosis or other affection of the olfactory nerve endings in the nasal mucous membrane. It is worth while trying a course of shrinking drops for the nose, such as 0.5% ephedrine in normal saline, instilled into the nose in the head-low position twice daily for three months. This will shrink up the nasal mucous membrane and so permit the maximum amount of vapour to enter the olfactory epithelium. If, after three months of regular treatment, there is no improvement, then it is unlikely that the sense of smell will ever return.

Hookworm Disease and Duodenal Ulcer

Q.—*In this district hookworm disease and peptic ulceration are both very common. Peptic ulcers that come to operation for one reason or another are nearly always pyloric or duodenal. It seems likely to me that this is more than a coincidental association. Has any work been done on such an association or on hookworm as a causative factor in chronic peptic ulcer?*

A.—As far as can be discovered, no work has demonstrated a causal relationship between hookworm infestation and duodenal ulcer. Although there are areas in the world in which both conditions occur commonly, the geographical distribution of the two is generally quite distinct, peptic ulcer occurring most commonly in populations in whom ankylostomiasis is rare or absent. Conversely, in the areas of heaviest hookworm infestation, peptic ulcer, in the sense generally understood, is extremely rare—e.g., tropical Africa.

On the other hand it is well recognized that ankylostomiasis may give rise to symptoms similar to those of duodenal ulcer. In particular, discomfort and pain in the epigastrium and the right side of the lower chest, sometimes relieved by food, is common to both conditions, as is melaena. Pathologically, extravasations of blood are often seen in the duodenal mucous membrane in heavy hookworm infections, and these may be large enough to appear as mucosal cystic haematomata, which may well break down and form small superficial ulcers; but these are quite dissimilar in pathological appearance to chronic peptic ulcers. There may also be quite marked duodenitis, possibly simply as a result of the irritation caused by the presence of many worms, but possibly also having some more specific causation.

While it is possible that the presence of hookworm might aggravate an existing duodenal ulcer, a causal relationship between the two is unlikely.

Herpes Complement-fixation Test

Q.—*What is the herpes complement-fixation test? What are its uses?*

A.—The herpes complement-fixation test has been used experimentally for identifying the virus of herpes simplex, the causative agent of fever blisters; or for determining the existence of specific antibodies against that virus. At present it is of use in research rather than for clinical diagnosis. The isolation of virus from a presumed herpetic lesion is a more reliable diagnostic method.

Ice Hockey Accidents

Q.—*Are there any injuries peculiar to ice hockey which a medical man should be prepared to treat?*

A.—In spite of the speed of the game, accidents in ice hockey are relatively infrequent. There is no single injury which is peculiar to the game—almost any type of injury may occur. The commonest are the usual injuries to ankles and knees. Serious cuts from the blade of the skate do happen, but are not frequent.

Can it be Hysterical?

Q.—*What treatment would alleviate periodic bursts of spasmodic unproductive cough, lasting a few minutes and occurring about twice a week, in a woman of 42? They date from the curettage of a tuberculous abscess in the neck four years ago, but the scar is supple and apparently not attached to deeper structures. The bursts are initiated by quite trivial causes, such as laughter, and even come on without any noticeable cause at all.*

A.—It is very difficult to answer a question of this kind without seeing the patient, but usually patients with this type of symptom turn out to be hysterical. Such a diagnosis, of course, should not be made until definite organic lesions have been excluded by physical examination, radiograph of the chest, blood sedimentation rate, and, if possible, sputum examination. Although cough will occasionally occur from stimuli to branches of the vagus, it seems improbable that this will be the explanation in the case mentioned. Should it be agreed that the case is hysterical the usual search should be made for the precipitating cause and this relieved if possible. The actual symptom may be relieved by some form of strong suggestion. Possibly infiltration of the scar with procaine might serve, but it will have to be accompanied by firm assertion that the cough will be cured.

NOTES AND COMMENTS

Shining Eyes and Lion Men.—Dr. D. J. B. WILSON (High Wycombe) writes: The illuminating reply by your expert ("Any Questions?" October 25, p. 952) to the query about the nocturnal glow from the eyes of certain animals does not explain the curious differences of colour—red, green, yellow, etc.—varying with the species. The tapetum, or layer of pigments behind the retina in the *Felidae*, for instance, is a crystalline substance with the quality of reflecting light strongly from another source. But differences in the colour of the light reflected from the eyes of different species are due, at least in part, to the number and arrangement of the blood vessels in their eyes. Thus when these vessels are few the glow is whitish, but a more generous supply gives a reddish glow. Although the tapetum is absent in the human eye, it may well be that the injected retinal vessels of the notorious "Lion Men" can under certain conditions be viewed as red points when caught in a beam of light, the more so if a mydriatic has been instilled.

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